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Paper and Paper-Making.

Great and gigantic have been, and are, the thoughts of man, from the earliest ages to to-day; and as each true thinker has ideas which are for the good of his species, how necessary then does it become that these ideas, suggestive or retrospective, should be widely diffused, and securely transmitted to posterity, so that the world shall be growing happier and wiser every day, by the possession of the knowledge of the past, and the science of the present. All the people of the earth have felt this, and thus with some it was the custom for the orators and priests to pronounce in public places the great thoughts of the great men, in order that they should ever be remembered. The Egyptians, who had more knowledge than any other ancient race, knew the value of recording facts, and made a thin and flexible material of the *papyrus*—from which our word "paper" is derived—and on it inscribed, by symbolic pictures, their learning and laws. This kind of writing is called "hieroglyphic," from two Greek words, signifying the writing of the priest, because in those days the priests were the scribes of the nation, and to them was left the recording of the great deeds of the heroes, and extolling the virtues of the kings. The intensely practical Phœnicians, the Yankees of the olden time, invented letters, and their alphabet consisted of sixteen. Cadmus, the builder of Thebes, carried the invention into Greece about 1400 B. C., and from thence they traveled over the whole world, and thus in time every nation had its written, as well as its spoken language. Now arose a great necessity for a material on which to impress these characters, that words might be formed by the combination of letters, and thus whole sentences would be indelibly fixed. Papyrus would not supply the demand, so the skins of animals were next called into requisition, and parchment was used, then cotton and linen paper was invented. In some times and places the skins of fishes and the backs of tortoises have been written upon. Nearly all kinds of leaves have thus been made useful, and on this continent the Aborigines expressed their ideas by hieroglyphics inscribed on bark. The Chinese have made and used excellent paper from time immemorial.

At the present time, when not only good thoughts, but every thought and deed is recorded, when nearly every one can write and read, when printed information lies in heaps, as books or newspapers, waiting for distribution among mankind, the amount of paper used must be immense; add to these the finer paper used for writing, and the coarser paper used to envelop parcels, and the quantity swells almost beyond conception.

It is very difficult to obtain statistics concerning the paper trade in this country, and the only information we have been able to obtain is, that there are about 750 paper mills in the United States, the average production of each being about one tun per day. As, however, more than three-quarters of them are worked by water power, which is only available for eight months in the year, the total annual production will be about 220,000 tuns, besides which we import about two million pounds annually from France and England.

But how is paper made? Through the kindness of Messrs. J. & R. Kingsland, of Franklin, N. J., we are enabled to give an account of the processes, having inspected their mill for the purpose of learning how paper is really made. Every one knows that it is made from rags, cotton, or linen, and about these rags there are some curious particulars. Thus the rags which are imported from Leghorn in Italy are generally very dirty, and well worn, and from a bale of them it is astonishing how one can obtain information of the customs of the wearers; thus, for example, it is only during the last few years corsets have been found among these rags, so it is safe to assume that the peasant women of Italy have only lately worn those "particular vanities." Leghorn rags are worth from 7 to 7¼ cents per pound. We also saw some rags which had been picked up from before Sevastopol—tents and clothing. Strange mutations, but happy change! The trappings of horrid war at last come to an American paper mill, and are made into newspapers—the heralds of peace—and books and maps—the diffusers of knowledge.

Domestic rags are least worn and cleanest when they arrive at the mill, and consequently take less labor in the first process, which is "dressing." The rag picker or collector sorts them into colored and white, linen and cotton, and they enter the factory in separate bales. The bales are cut open, and the rags conveyed to the "dressing" room. Here are a number of females, each standing before a table with a sharp knife projecting from it, and with this they cut the rags into strips, and scrape off any dirt or mud that may be on their surface. From this room the strips are conveyed to a series of cutters not unlike straw cutters, only that the knives are straighter; the first one cuts them into shorter strips, and the next cutter cuts them transversely, so that they leave the cutters in small pieces. These small bits are carried by an endless band to a spiked duster, which beats all the dust out and tears them again. This machine is not unlike many smut machines, being an horizontal drum slightly conical, with a spiked beater revolving in it; this, however, tears, while the smut machine only rubs. In mills where coarser varieties of paper are made, the spiked duster is represented by a machine called "the devil," from the ferocious style in which it tears up all substances placed within range of its teeth. The dust which flies from the duster, as it contains some fiber, is sold to other paper makers, who produce from it the paper of which boxes are made. One pound of the best rags will make three-quarters of a pound of paper; some rags will only make half their weight of paper.

The torn and dusted rags are next boiled in large boilers with lime and soda ash, in varying proportions, according to the state of rags, and other conditions. A false bottom is placed in the boiler, and about ten cwt. of rags with lime and soda ash piled on it until the boiler is quite full, the lid is then placed on, and steam admitted for from twelve to eighteen hours, when the false bottom is lifted out, and the rags with it. The lime in this process softens the rags and loosens the dirt, and the soda ash combining with the grease in the fabric, makes a soap, which enables the dirt to be more easily washed out.

The next process is that of washing and bleaching. The rags are placed in long tubs divided down the center, with an opening at each end, so that they can move around it, and a stream of clean water is constantly passing through it. The rags are thrown against a wire gauze screen, so that the water passes through and the rags remain behind, and they are moved forward by a cylinder that has a series of knives on its periphery, which cut them up, and force them around to the washers. This is called a "washing engine." The dirty water is removed by a rotating strainer, of hexagonal or octagonal shape, having a wire gauze surface, that rubs them, and the dirty water passes through its center to a shute, by which it is conveyed away. When thoroughly washed, the rags are mixed with a clear solution of chloride of lime. These processes are called "breaking in." The rags stay twenty-four hours in contact with the chloride of lime in tanks, and when this has been drained off it is called "half stuff."

All the bleaching is now washed out in a machine similar to a "washing engine," and the blueing (ultramarine), sizing, and alum added, and if the paper is to be colored, the coloring matter is here introduced. The "half stuff" is passed from this into a cistern, where it is kept in motion by an agitator, and from this, in most mills, it is carried to a "beating engine," which makes "pulp" of the "half stuff" in from four to twelve hours; but at Messrs. Kingsland's it is elevated by elevators and passed through a pulp engine, the invention of Joseph Kingsland, Jr., and patented by him December 16th and 23d, 1856. It is fully represented in the accompanying illustration.

KINGSLAND'S PULP ENGINE.

Fig. 1

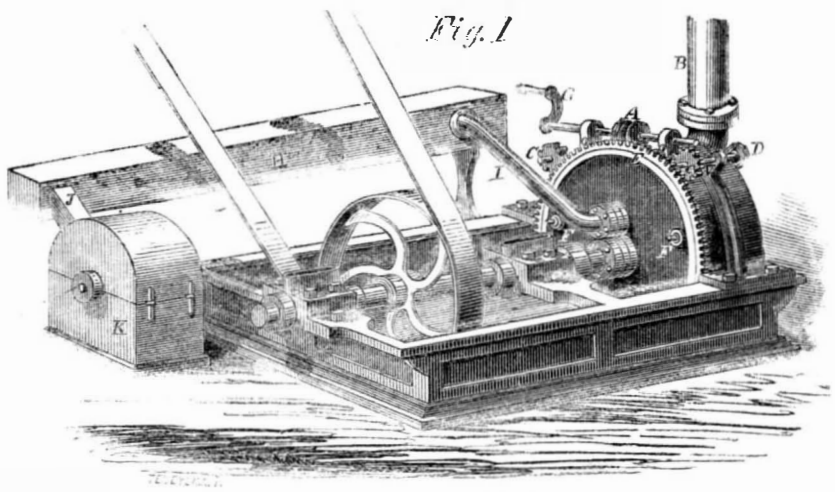


Fig. 2

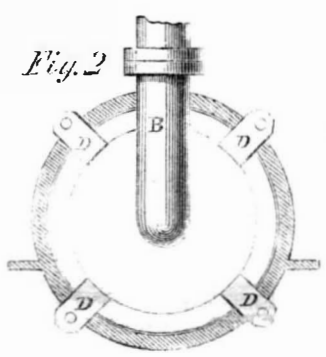


Fig. 3

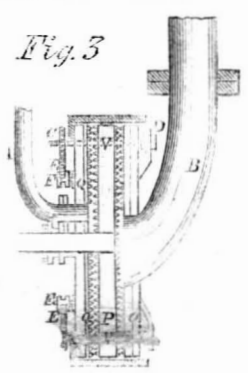
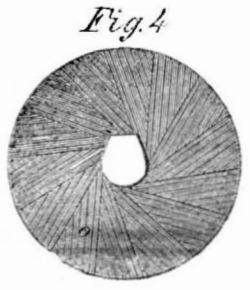


Fig. 4



The "half stuff" descends the pipe, B, Fig. 1, and passes into a circular chamber, the sides of which are formed of two plates, O Q, provided with cast iron teeth; these are stationary, and can be brought closer together or placed further apart by the handle and gearing, G A C E, so as to grind the "half stuff" into pulp of the desired length of fiber. The threaded bolts, V, passed through lugs, D, bring up the back plate, O, while F form guides for E. Between O and Q a plate, P, is placed; it has steel teeth, and is rotated rapidly between them by a shaft and belt. This shaft works in journals, and has no collars, so that it can adjust itself to the varying distances between the outer plates, and the different texture of the steel and cast iron teeth insures the perfect working order of the machine. The pulp, when ground, passes through a pipe, I, in a continuous stream into the intermediate receiver, H, and from that through a shute, J, over a strainer, K, to a "stuff chest," in any convenient location.

In our illustrations Fig. 1 is a perspective view, Fig. 2 a back view, Fig. 3 a vertical cross section, and Fig. 4 a front view of the plate, O, of the engine.

This is a decided improvement over the old "beating engine," doing better work with less attention and power, and its performance and delivery is centinuous. The inventor states that one of these engines of 30 inches in diameter is capable of doing as much work as four of the ordinary engines, with rolls 28 inches in diameter and 30 inches face. Messrs. J. & R. Kingsland can furnish one that will beat clearer and better pulp, suitable for sized or water leaf, white or colored, coarse or fine paper, at half the first cost, and requiring one-third less power for the same quantity of work as an ordinary one. They may be addressed as above.

The "stuff chest" is a large wooden cistern

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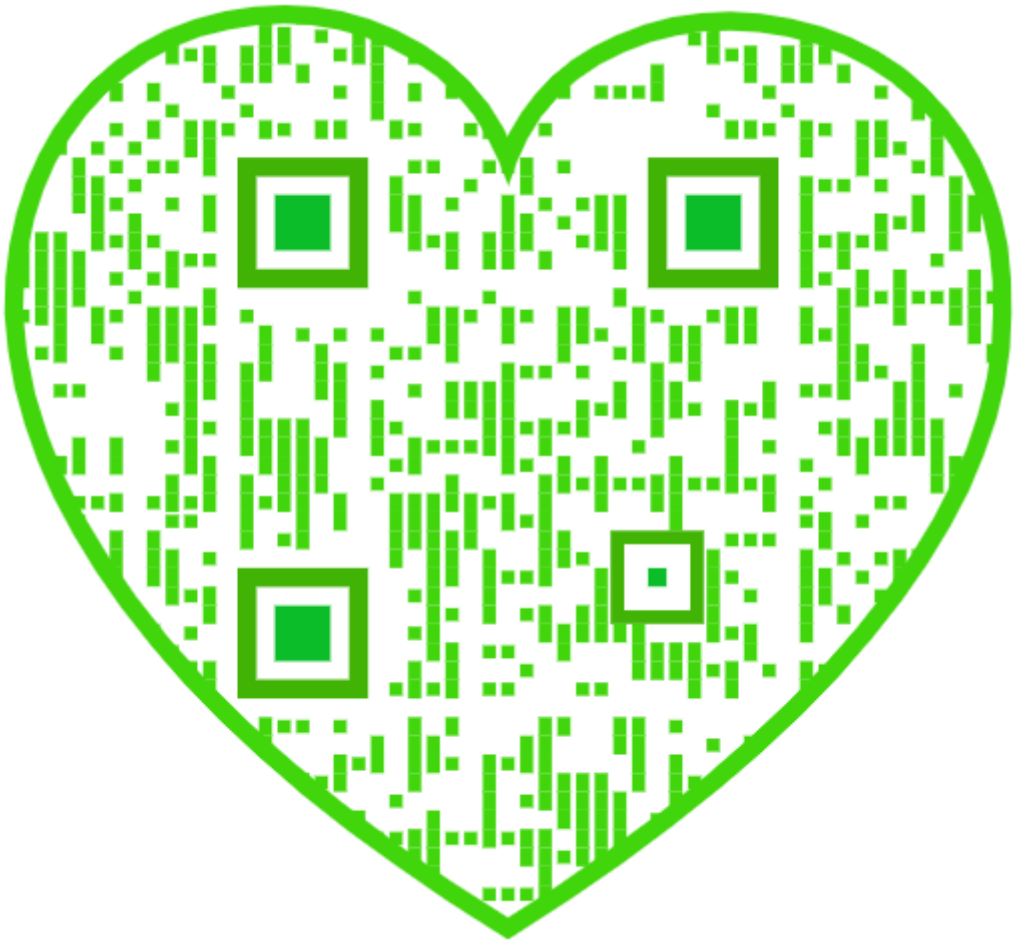

at one end of a long room, and the pulp runs from this on to a strainer, and then on an endless wire cloth, which has a quick vibratory movement given it to weave the fibers together. On this the pulp lays in a perfectly even thin sheet, the water dropping through the interstices of the wire continually, the wire cloth passes over a suction frame, by which the atmospheric pressure forces out a further quantity of water from the pulp, and more water is taken out by a roller covered with felt, and called a "couching roller," before the paper—for it is such now—finally leaves the wire cloth. The under roller is placed a little in advance of the upper or "couching roller," so that the water is all pressed out of the paper, and not through the fabric, as would be the case were both rollers on the same perpendicular axis.

The differences of laid or wove paper or a water mark, which have to be impressed on paper, are done by peculiar rollers, the roller having the special pattern upon its periphery in wire, and it is pressed upon the pulp just before it comes to the "couching roller."

The paper is then passed between iron rollers, which exert a pressure of about one tun on one side, and it is then turned round by a system of rollers, and pressed on the other side by similar iron rollers, also exerting a pressure of about one tun. The paper then passes between and over six steam-heated drums, and is thoroughly dried, the temperature varying with the thickness of the paper. It is next calendered between four iron and two paper rolls, and the map paper, which we have seen in process of manufacture, was finished, and worth 17 cents per pound. If writing or envelope paper is to be made it can be passed through animal size after the last process, and dried by heated air in a machine also invented by Mr. Kingsland.

The paper is taken on the rolls on which it has been wound, and is then again calendered, has the polish put on, and is cut into the proper size for its special use in a cutting machine, the cutter of which is revolved by cone pulleys, so that it can be rotated at any speed in relation to the feeding rollers, which receives an independent positive and unvarying motion, and thus the paper can be cut into any desired lengths.

This is the whole process of paper-making, told as simply and plainly as we are able, and is the precursor of many similar articles, in which we shall endeavor to explain how other useful substances are manufactured. The power of this mill is derived from one Scotch motor or re-action water wheel of 50 horse power, and one steam engine of 35 horse power—the machine which makes the paper from the pulp being worked by an independent wheel, as it requires a very steady motion.

In conclusion, we hope that our readers may derive as much pleasure and profit from our recital of the manufacture of paper as we had in investigating it at Messrs. Kingsland's mills one sunshiny day last month, when the birds were singing joyously, and the trees waved gracefully in the gentle breeze under a cloudless sky, and all nature seemed at rest on the banks of the Passaic.

Improved Journal Box.

R. H. & W. Olsen have lately obtained an English patent for a means of retaining the oil or other lubricating material in the boxes of journals, and better distributing the same over the surfaces of the journals. It consists in inserting in the journals or bearings of shafts, axles, or other bodies requiring to be lubricated, pieces of wood, which, by the abscription of the oil, become impregnated therewith, and maintain the lubrication for a considerable time when the supply of oil is irregular or deficient.

PATENTS IN ENGLAND.—In 1857, 3,200 applications were made for Provisional Protections, and 2,027 patents issued thereon.

Issued from the United States Patent Office

FOR THE WEEK ENDING SEPTEMBER 28, 1858.

[*Reported officially for the Scientific American.*]

*** Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

CORN SHELLERS—A. Adams, of Sandwich, Ill.: I do not claim any of the parts separately.

But I claim the combination of the yielding plate, H, and guide bar or plate, J, with the wheels, C and E, and spout, G, provided with the elastic plate, F, when these several parts are constructed and arranged for joint operation and relatively with respect to each other and to the discharge passages, in the manner and for the purpose set forth:

[This is an improvement in that class of corn shellers in which vertical shelling and feeding wheels are employed. The invention consists in having a yielding plate placed opposite the face side of the shelling wheel, and used in connection with a guide plate or bar, the parts being arranged so that the ear of corn, while being shelled, will be subjected to the action of the shelling wheel a sufficient length of time to be completely shelled, and the cobs discharged from the machine separately from the corn.]

SEEDING MACHINES—George C. Bunson and Cyrus Roberts, of Belleville, Ill.: We claim, first, The employment or use of the cylinder, G, provided with step-like projections, j j, between circumferential flanches, h h, oblique partitions, i, and zig-zag grooves, k, said cylinder being fitted within a cylindrical case, F, at the bottom of box D, and having a reciprocating rotating motion, as and for the purpose set forth.

Second, The arrangement of the adjustable tubes, K, attached to the arms, J, as shown, the rollers, g, and cutters, i, whereby both the cutters and tubes may be adjusted as desired, and the pressure on the cutters graduated as desired, as also the depth of the furrows made by the cutters.

[The nature of this invention is described in the claim; it is an improvement in that class of seeding machines designed for sowing seed in drills or broadcast.]

MACHINE BELTING—John H. Cheever, of New York City: I do not claim broadly the employment of wire in machine belting.

Nor do I claim as new the use of rubber or other gums in the manufacture of belting; but the object I wish to obtain is, the production of a belt or band in which the wire and india rubber or gutta percha are so combined that the former gives it great strength, while the latter gives it a surface of desirable character.

I claim the manufacture of belts or bands of a combination of india rubber or gutta percha with wire cloth or netting, or strands of wire, substantially as and for the purpose described.

[It is the design of the patentee of this invention to manufacture belts of about the usual thickness, the center composed of annealed wire cloth and the outside of fibrous vulcanized rubber, thus combining great strength with a material slightly elastic, possessing unusual durability, and insuring perfect adhesion to the pulley. The patentee has been identified with the manufacture of vulcanized rubber belting from its commencement, and is favorably known as the head of the New York Belting and Packing Co., whose deservedly popular manufactures we have heretofore had occasion to notice. It is his intention not to introduce this invention to the public until the belts have been thoroughly tested in practical use, the experiments thus far having proved perfectly satisfactory.]

EXPANSIVE BIT—William A. Clark, of Bethany, Conn.: I do not claim a wedge, or a wedge and screw combined, as a means of securing a movable cutter.

Neither do I claim a bit with two movable cutters, in front of which the stationary cutter delivers its chips. This is not new, and further, it does not accomplish the purpose for which my invention is designed, as the chips are not all delivered upon the same side of the instrument, and the back side thereby allowed to be left entire as in my invention.

The improvements which constitute my invention, and which I claim are, first, The combination of the follower, D, beveled upon its under side, in such a manner that driving it home against the cutter shall crowd it upward, with a lip or shoulder above it upon the shank, which lip or shoulder is so formed that this upward pressure mentioned shall crowd the upper edge of the follower in against the seat back of it, when the upper edge of the follower is beveled to correspond, as set forth, for the purposes stated, the follower being brought home to its place by a screw, or in any equivalent manner.

Second, So arranging the movable and stationary cutters in relation to each other, and to the other parts, that all the chips made by the instruments shall be delivered upon one and the same side of the shank of the bit, thereby allowing the back side of the shank of the bit to be left entire, as set forth.

PLOWS—David Cockley, of Lancaster, Pa.: I claim the adjustable cutter wheel, N, cleaner, W, and devices, V X Y Z, when arranged with the regulator, C, in combination with the beam, F, and the whole constructed for operation conjointly as and for the purpose set forth.

I also claim the manner of arranging and fastening the point, c, share, d, and landside with its cutter, j, so as to hold them with the short screw, k, and plate, l, in combination with the mold board, h, and beam, F, substantially as described.

MAKING NUT BLANKS—Richard H. Cole, of St. Louis, Mo.: I claim preparing the nut blank by driving a punch into it while it is confined against a blank surface, by means of the mechanism constructed and arranged substantially in the manner set forth.

COUCHES FOR RAILROAD CARS—J. B. Creighton, of Tiffin, Ohio: I claim the combination of the couches, A A', folding partitions, B B', stretchers, a a c c, slatted supports, d d, and hooks, m n, and pins, o p, the whole being arranged, constructed, and operated in the manner and for the purpose described and set forth.

SUGAR MILLS—Samuel L. Denney, of Lancaster co., Pa.: I claim the combination of eccentric bearings, R R, their arms, c c, connecting rod, D, lever, F, sliding belt, g, hand piece, M, and arch, H, or their equivalents, substantially in the manner and for the purpose set forth.

ATTACHMENT FOR TACKLE BLOCKS—George Focht, of Reading, Pa.: I claim so attaching a tackle block that it may turn freely in all directions, and be retained in the proper relative position with the rope when the strain on the rope ceases, in the manner substantially as described.

TEMPERING STEEL CAR SPRINGS—Perry G. Gardiner, of New York City: I claim, first, The subjecting the oil or fluid divided into streams or showers to the contact of a blast of cold air while falling, by means of the cylindrical chambers or compartments, and the cylindrical air chamber operating as described, or in any manner substantially the same.

Second, I claim the construction, arrangement, and combination of the cylindrical chamber, G, the cylindrical chamber for distributing the air, H, and the disk and perforations, as described.

Third, I claim the arrangement and combinaiion of the tanks, A B, and the coils of tubes or worms, the chambers, G H, and their connections operating together, so as that at the same moment the oil or fluid is subjected to the cooling by both air and water, as described.

COMPOUND RAILROAD AXLES—I. P. Garrett and Daniel Steckel, of Mercer co., Pa.: We claim a compound axle, the main portion of which extends through both wheels, and equals in length the width of the track, and is reduced in size from the center to one end, in combination with a tubular axle of half its length, in which the reduced part of the main axle revolves, as in a journal, one wheel being secured to the main axle, and the other to the tubular part, arranged substantially as described.

METALLIC FRAMES FOR VAULT LIGHTS—Michael Grasz and Peter H. Jackson, of New York City: We claim the Π-shaped metallic bars receiving the glasses in combination with the wrought iron bars of a grating, over which the said Π-shaped bars set and are sustained, substantially as and for the purposes specified.

CRACKER MACHINE—J. Holyland and J. C. Holyland, of Rochester, N. Y.: We do not claim the endless apron, reciprocating cutter plate, nor feed roller, c.

Neither do we claim the friction gear for operating the apron, B.

But we claim the arrangement and combination of the socket, l, arm, k, spring, p, and rod, n, as and for the purposes shown and described.

[For more information regarding this invention, see another column.]

MOWING MACHINES—George F. Jerome and Moses Jerome, of Mineola, N. Y.: We are aware that curved shoes have been attached to reapers and mowers, and arranged in various ways, and we do not claim broadly, and irrespective of the arrangement shown and described, such device.

We are also aware that caster wheels have been used and applied in various ways, both to reaping and mowing machines; we therefore disclaim the caster wheel separately, or in itself considered.

But first, we claim the caster wheel, K, when attached by the shoes, G G, or their equivalents, by having its arbor, J, pass loosely through a socket, I, attached to the cross bar, H, and having a swivel, b, at the upper end of the arbor, so that by the aid of pulleys, c d, or other guides, and a chain or cord, e, the weight of the finger bar and sickle will be transmitted to the caster wheel, and the finger bar and cutter raised and lowered, while the caster wheel is allowed to turn freely in any direction without affecting in any degree its concomitant parts.

Second, We claim the lever, L, and spring, N, in combination with the chain or cord, e, caster wheel, K, and shoes, G G, when the whole are arranged to operate substantially as and for the purpose set forth.

[This invention relates to the employment of certain means for elevating and depressing the cutting device or sickle, and sustaining the same, so that as the machine is drawn along the sickle is allowed to readily conform to the inequalities of the ground, the sickle being easily manipulated by the driver, and the draft pole permitted to be so attached to the machine and placed relatively with the working parts, that the draft will have no tendency to elevate the working parts.]

COMBINED COOKING RANGE AND HEATING APPARATUS—Charles Kane, of New York City: I claim the arrangement of an air chamber, C, under the whole range, with a flue or flues, B B, connecting it with the hot air chamber, A, together with the double flues, d d d d, e e e e, in double tiers between the air chamber, C, and the bottom of the ovens, D D, through and in which last mentioned flues the combustible gases and smoke circulate before reaching the smoke flues, g g, the whole constructed and operating substantially as and for the purpose set forth.

BALANCE SAIL RIG FOR SHIPS—John Lewis, of Elizabeth City, N. J. Patented in England September 4th, 1855: I am well aware that square sails have been used, supported by yards and frames.

I am also aware that a pyramidal frame has been used to support a sail; and I do not claim a spring beam in itself.

But I claim the spring beam, b, applied between the pyramidal frame or shears, c c, and the sides of the vessel, and connected to both the frame and vessel in substantially the manner and for the purposes specified.

I claim constructing a frame to receive sails by the horizontal yards, combined with the double ranges of spars and braces, substantially in the manner specified, whereby the said yards are permanently sustained at the desired distances apart, and a clear space is left from end to end of said yards for spreading the sails, without their coming in contact with the said spars and braces, as described.

I also claim the sail frame constructed as aforesaid, and combined with the pyramidal shears, c c, by the joint, x, near the middle of said sail frame, whereby the aforesaid sail and frame are sustained, and permitted to be turned in the manner and for the purposes specified.

METHOD OF HEATING OVENS BY STEAM—Hamilton Lyon, of Cincinnati, Ohio: I claim the combination of the pipes, F E G and H, chambers, B and C, and exhaust, I, or their equivalents, arranged and employed substantially in the manner and for the purpose set forth.

MECHANICAL POWER—Elisha Matteson, of Troy, N. Y.: I claim the arrangement of gearing, L K J I M N H H, in combination with the shaft, B, weight, F, and wheel, G, substantially as and for the purposes set forth.

[This is an ingenious mechanical motion, and consists of an arm provided with a weight, extended from an inclined shaft, so that whatever advantage is to be had in transmitting power by the momentum of a weight in such a position, is by this device obtained.]

HARVESTERS—David S. McNamara, of North Hoosick, N. Y.: I claim first, Constructing the frame of the machine of the bars, a b c d, end piece, H, and finger bar, F, in connection with the trusses, E D and K, when the whole are arranged substantially as and for the purposes set forth.

Second, In combination with the frame constructed as above, the shoe, G, when constructed as described, and secured to the finger bar, F, and end piece, H, in the manner and for the purposes set forth.

[The frame of this machine is constructed in a peculiar manner, whereby great strength combined with lightness is obtained, and suitable provision made for "straining" the frame, or bringing it back to its original position, in case certain parts become casually displaced by use, and are made to assume undue positions, detrimental to the perfect operation of the machine.]

DREDGING MACHINE—Abel Minard, of New York City: I do not claim the rotary dredge wheel, nor placing buckets upon the periphery of such wheel, nor the manner of applying power to the same, nor the means employed for raising and lowering it.

I claim first, The combination of the spring catch, E, lever, F, and curve, G, with the lid or shutter of the bucket, G, for the purpose of tripping the lid to empty the bucket of its contents, as described.

Second, The attachment of the dredge wheel, B, the engine, I, and chute, J, to the hinged frame or platform, H, as described, which attachment allows the chute, J, to retain its relative position to the dredge wheel at all points of the latter's elevation, and the engine, I, to be connected to the wheel, to work it at all points of its elevation without the intervention of other connections or gearing than that shown.

CAST IRON CAR WHEELS—Hiram W. Moore, of Jersey City, N. J.: I claim my described cast iron car wheel, the hub of which is made of an inner and outer straight cylinder, F and E, joined together by concentric plates at their ends, and an intermediate plate, H, between, for imparting great strength and durability to the wheel, and in combining and uniting such hubs to the rim or tread by straight plate, A, radiating therefrom, between the end of the hub and intermediate disk, H, or connection otherwise formed, in order that every portion of the wheel may be of a uniform thickness, to cool even, be durable, and cheaply constructed, and to render hooping of the tub unnecessary, essentially in the manner fully set forth and described.

AMBULANCE WAGON—Israel Moses, of New York City: I am aware that several devices have been employed in emigrant wagons, traveling carriages, and other vehicles of a similar nature, to enable them to afford shelter, and to perform, in some degree, the part of a domicile. But the necessity of reducing everything in an army deemed of extraneous character to the mere purposes of combat has heretofore caused ambulances to be constructed in the simplest manner possible, with perfect disregard of comfort to the sick, and of convenience to the attendants.

My improvement is intended to overcome these objections, by combining in one vehicle not only the means of transport and protection to the sick and wounded, but the surgeon's office and stores, as well as a hospital camp.

Therefore I do not claim any of the devices employed by me, separately and irrespectively of their peculiar construction and arrangement.

But I claim an army ambulance, constructed and arranged as described, that is to say, having ability to transport the sick and wounded under cover, either lying or sitting, by means of a system of sectional folding seats, arranged along the sides as described, as also for carrying the surgeon's medicines and implements in removable cases, fitting in and under said seats, and arranged in drawers under the body of the vehicle, so that said cases may be used for general or detached service, as required; and also the arrangement of an adjustable door, capable of serving as a table, as set forth; together with the arrangement described of the hammock for one, two, or more persons, and finally, in combining with the vehicle as a central support the tent necessary for the hospital camp, the whole being combined and operating as a connected device for transporting, subsisting, and protecting the sick and wounded of an army, and their appropriate attendants, as set forth.

KEYHOLE STOP—John Moulson, of Philadelphia, Pa.: I claim the construction of a keyhole stop, consisting of two pieces of metal, one to slide into the other, which, when introduced into a keyhole, first the female and then the male piece, in conjunction with a lug on one piece, and a padlock on its equivalent, through both pieces, all combined as described, or their equivalents, will fill the keyhole, and effectually prevent depredations on locks, by preventing the introduction of any unwelcome key or other instrument therein.

LAMPS—W. Mulholland, of Brooklyn, N. Y.: I am aware that air tubes have been placed centrally in the bodies of lamps, in order to supply the flame with air or oxygen; but so far as I am aware, such lamps have all been provided with buttons, in order to throw the air down upon the flame, and also to spread the flame. In my invention the button is entirely dispensed with, an upright flame obtained, and the supply of oxygen regulated as occasion may require, by adjusting the register, C.

I am also aware that perforated plates have been used for distributing the air equally all around the flame. But I am not aware that a perforated cap has been used, arranged as shown, with deflectors, f, to admit the air directly upon the external surface of the base of the flame.

I disclaim, therefore, broadly, separately, and irrespective of construction and arrangement, the employment or use of a central air tube, and a perforated plate to serve as an air distributor.

But I claim the arrangement of the central air tube, B, extending through the body, A, of the lamp, and communicating at its lower end with the rack, a, provided with a register, C, and perforated plate, a, with the wick tubes, c c, placed at opposite sides of the air tube, B, and the perforated cap, D, provided with the deflector, f, the whole being constructed and operating as and for the purpose set forth.

[This invention consists in having a central air tube placed within the lamp at each side of its upper end, and a register at its lower end, the above parts being used in connection with a perforated cylindrical cup, provided with deflectors at the center of its top plate, whereby the flame may be supplied with a large volume of oxygen, and the same regulated as occasion may require.]

MACHINE FOR PLANING IRREGULAR SURFACES—James H. Nelson, of Oskaloosa, Iowa: I do not claim placing rotary planers within adjustable or yielding frames, for such device has been previously used in planing, stave-jointing, and analogous machines.

But I claim the combination of the elastic or yielding frames, B B I, provided respectively with planers, G G, and feed rollers, K, and arranged relatively with each other, so as to operate as and for the purpose set forth.

[The rotary planers are placed within yielding or elastic frames, and used in connection with feed rollers, also placed in a yielding frame, so that the planers and feed rollers may conform to the curvatures of the stuff, and perform their respective functions equally as well as if they were stationary, and operating on straight stuff, or stuff with parallel sides.]

BREAD AND CRACKER MACHINES—William R. Nevins and Joseph J. Yates, of New York City. Patented in England March 13, 1857: We claim, first, Extending the endless apron, H, for the conveyance of biscuit or crackers, and oval or angular bar, J, over which it passes, beyond the end of the frame, A, and arranging the same in the relation to the hexagonal roller over which the endless metallic apron, H', of the oven passes, and which has a corresponding intermittent progressive motion with the endless apron, H, in the manner and for the purpose described.

Second, We also claim combining and arranging with the lower endless apron, H, in the relation described, the upper endless apron, D, for separating the scraps from the biscuit, as described, the two aprons, H D, being made to move together, by means of the ratchet wheels, F G, notched bars, L L2, and oscillating arm or bar, L], attached to rock shaft, S, which may be actuated by an eccentric or other convenient means, as set forth.

[A full description of this invention will be found on another page.]

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BAKER'S OVEN—William R. Nevins and Joseph J. Yates of New York City. Patented in England March 13, 1857: We claim the combination and arrangement of the endless apron, H', and hexagonal rollers, H, to which an intermittent progressive motion, corresponding with the motion of the apron of the cracker or biscuit-cutting machine is given, horizontal flues, K K', and bridge wall, B, between the lower flues, K, and furnaces, R, substantially in the relation to each other described, and for the purpose set forth.

[A notice of this improvement will be found in another column.

MACHINE FOR ADDING NUMBERS—John B. Newbrough, of St. Louis, Mo.: I do not claim as my invention the rotating dial, and the manner of its movements.

But I claim the obstructing wheel, containing a successive number of slots, corresponding to the circles of figures on the dial, when arranged in combination with the dial, to produce the result as shown and described.

MACHINES FOR SAWING MARBLE, STONE, &c.—James Norman and Aaron R. McLean, of West Dresden, N. Y.: We claim the carriage as constructed of the parts, E E', and F F', with the means for holding and adjusting the same, and for holding and adjusting the stone thereon, in combination with the endless saw, when the several parts are constructed and arranged substantially in the manner and for the purpose set forth.

REVOLVING FIREARM—William Palmer, of New York City: I claim the combination of the trigger, g, hammer, e, seer or hair trigger, k, and slotted plate, h, or its equivalent, substantially as specified, whereby the hammer is cocked by the pull of the trigger, g, and then disconnected therefrom, so that the strain is transferred from the trigger, g, to the hair trigger, k, and then the latter is disconnected by the further pull of the trigger, g, as set forth.

INDIA RUBBER CAR SPRINGS—Sanford Peatfield, of Ipswich, Mass.: I am aware that vulcanized india rubber car springs have before been formed by winding a thin sheet of prepared india rubber, or woven webbing prepared with india rubber, on a mandrel in the form of a scroll, while in a green state, as it comes from the heated calendering cylinders, therefore I do not lay claim to a spring thus formed of prepared woven webbing.

But I claim the application in the construction of car springs, of the combination knit and rubber fabric specified, in the following manner, to wit., the combination knit and rubber fabric being wound in several layers tightly round a central axis or "former," or placed flatwise layer upon layer over the axis or former, and afterwards pressed and acted upon by heat until it becomes a compact or united universally yielding mass, substantially as and for the purposes set forth.

[A notice of this improvement will be found in another column.]

CULTIVATORS—Thomas Wm. Poole, of Brunswick, Ohio: I claim the combination and arrangement of the hinged arms, B B B B, and fixed concentric guards, D D D, in the manner specified.

CLOTHES' DRYER—Emma T. Porter, of Washington, D. C.: I claim the combination of the adjustable frame and supporting braces with the pivoted stand or foot-piece, substantially as and for the purpose specified.

LAMPS—William. H. Racey, of St. Augustine, Fla.: I claim the case, G, provided with a cap, L, and used with or without the external case, I, the case and cap being placed relatively with the frame M, as described, so as to operate as and for the purpose set forth.

[For more information about this invention see another page.]

RIDDLES FOR THRESHING MACHINES—F. W. Robinson, of Richmond, Ind.: I claim the plate, C, with lips or tongues, c c c c, as shown and described, in combination with slats, B B B B, for purposes set forth.

METHOD OF LAYING SUBMARINE TELEGRAPH CABLES—Samuel Samuels, of Brooklyn, N. Y.: I claim passing the cable from the ship or vessel through the bottom thereof, at or near the point specified, substantially as and for the purpose set forth.

And I also claim the employment, to conduct the cable to the bottom of the vessel, and to exclude the water from the opening in the bottom where the cable leaves it, of a tube, the whole or the lower part of which has a downward inclination toward the stern of the vessel, substantially as and for the purpose specified.

[A notice of this improvement is given in another column.]

PLOWS—B. B. Scofield, of Andover, Ill.: I claim the arrangement and combination of the pivoted bar, g, share, D, landside, E, standard, F, curved rack, e, pinion, G, and lever, H, as and for the purposes shown and described.

[This invention consists in combining a sulkey with a plow in such a way that a person while sitting therein, and merely driving the horses, may plow equally as well as by grasping the handles of the ordinary plow, and guiding it by that means.]

RAILROAD SWITCHES—Charles L. Spencer, of Providence, R. I.: I claim the use of two frog guiding rails, having the tread rails immovable, but an inside movable section of each guiding rail capable of working simultaneously together, for the purpose of influencing the course of a train of cars when proceeding in one direction, and of preventing injurious consequences in case the switch is improperly set when the train is proceeding in the opposite direction, constructed, applied, and operated substantially as described.

ROTARY PUMP—B. T. Trimmer. of Rochester, N. Y.: I am aware that annular pistons are and have been employed in rotary pumps, and the use of such I do not claim, except in combination with the described devices for rendering their operation durable and efficient.

But I claim the construction of the triangular reciprocating butments, L, working in grooves in the case, f f, with arms clasping around the edge and into the annular recesses, d, of the loose piston, G, to admit of the butment accommodating itself to eccentric action of the piston without materially obstructing the motor thereof, and at the same time packing against its seat, a, and the periphery of the piston, by the pressure of the water on its double inclined surfaces, i k, the parts being arranged and operating substantially in the manner described.

I also claim the combination and arrangement of the two cylinders or cases, A A, cams, I, pistons, G, and butments, L, with the chambers, C E, and ports, b b, and c c, whereby the parts will operate conjointly, for the purpose described, or either cylinder work independently of the other, substantially as set forth.

EMBROIDERY AND SEWING STAND—Wm. H. Trowbridge, of Saginaw City, Mich.: I do not make any claim to the invention of the spool rack, or to the work-box and its appendages

But I claim the combination of the plate, m, the spring, e, the screws, o, and i, the thumb-screws, g, the box, d, the spool rack, k l, arranged substantially as described for the purpose specified.

METHOD OF LAYING SUBMARINE CABLES—Owen G. Warren, of New York City: I claim the use of a reel, A, immersed in the water, to deliver a telegraph cable at the bottom of the sea, constructed and operated substantially as described.

I also claim the combination of the ree boat, B, with the reel for the convenience of using the brake or operating engine in the manner described.

MACHINE FOR MAKING WIRE SPRINGS FOR FURNITURE—C. A. and S. W. Young, of Providence, R. I.: We claim a single grooved roll, D, in combination with the upright rod, n, to effect the coiling of the wire.

We also claim varying the diameter of the coils to produce a bi-conical form in the spring by causing the roll, D, to approach and recede from the coiling rolls in a direct or curved line horizontally, substantially as specified.

LOCKS—T. B. Pye, of New York City: I am aware that sliding tumblers have been previously used and provided with slots made in them at varying distances apart, therefore I do not claim the tumblers separately.

But I claim the tumblers, C, slotted as shown, provided with projections, d, and used in connection with a shackle, B, or its equivalent, in combination with the bar, D, and spring, e, the above parts being arranged to operate as and for the purpose set forth.

CHURN—G. L. Farrington (assignor to D. B. Tiffany), of Xenia, Ohio: I claim the employment of the double concavo-convex dashers, constructed, arranged and operated in the manner specified and for the purpose set forth.

BLIND OPERATOR—J. A. Dorman and J. E. Stearns (assignors to J. A. Dorman), of Worcester, Mass.: We do not claim an inside blind operator as such.

But we claim, first, The combination of the rod, G, slide piece, H, and spring, K, with the catch plate, D, and knob, E, when constructed and operating substantially as described.

Second, The manner of holding the blind down in place by combining with the stud, R, the projection, S, fitting into the recess, T, as specified.

CLOTHES' DRYER—E. G. Gibson (assignor to H. G. Finkham), of Owego, N. Y.: I do not claim, broadly, a rising and falling frame, nor the lifting thereof by windlass and cords.

But I claim the arrangement of the square or box head, B, between the pieces, a' a', of the arms, c c, as and for the purposes shown and described.

[The object of this invention is to simplify the construction of revolving clothes' dryers, and at the same time to obtain a durable device, one that may be readily kept in repair, and constructed at a comparitively small cost. These articles are now quite extensively used, and are exceedingly valuable, for by their aid a large quantity of clothes may be exposed to the drying action of the air within a limited space; but as they have hitherto been made, the expense has been so great as to exclude them from use among those who most need them, namely, the poorer class, who, especially in large cities, have very small gardens or enclosures. This invention places them within the reach of all.]

HANGERS AND BOXES FOR SHAFTING—F. W. Howe, of Newark, N. J., assignor to the Newark Machine Company: I do not claim the self-oiling of the boxes, nor the adjustment of the boxes, nor do I claim by itself the device of a hanger open at the bottom, so as to receive the shaft and its box from below.

But I claim, in combination with such a hanger, the self-adjusting box in the manner set forth.

CUTTING THREADS OF WOOD SCREWS—H. L. Kendall and H. P. Hunt, (assignors to the New England Screw Company), of Providence, R. I.: We claim the cutting of the threads of wood screws by means of chasing tools whose cutting edges have profiles which are respectively counter parts of the body and sloping portions of the screws, and which are caused to act in succession upon the screw blank.

SEED DRILLS—Alexander Turner, (assignor to himself, R. Bess, and H. Sloane), of Franklin, Ind.: I claim the arrangement of the seed boxes, A A, and B B, the driving, C, secured as described, and the lever, a, wheels, c and d, rod, e, and seed slides, f f', and g g', the whole being constructed and operated in the manner and for the purpose fully described.

ROOFING MACHINE—E. Wise, of Hannibal, Mo., assignor to himself and C. L. Wood, of St. Louis, Mo.: I claim the combination of the adjustable wheel, C, with the two wheels B' B, substantially as described for the purpose specified.

I also claim the combination of the two connecting rods, g and h, with the lever, m, and the axles, f' f.

I also claim the arranging of the wheels, B' and H', against yielding bearings, substantially as described for the purpose specified.

RE-ISSUES.

SHINGLE MACHINE—James Crary, of Middleport, O. Patent dated Nov. 24, 1857: I claim, first, The use of two or more froes, arranged substantially as before described, for the purpose of riving two or more bolts from the block of wood at the same time, thus preventing the tendency of the wood to eat out or split too thin at one end or at either side.

Second, The use of brace bars, or their equivalents, so arranged in combination with the froes, as that the froes will encase themselves between them, thus securing the perfect separation and delivery of the bolts from the block.

Third, The use of sliding side pieces, L L, with conveying slots, c c, in combination with the upright grooves, d d, in the frame in which the wrists of the shaving knives are inserted, for the purpose of effecting the gradual approximation of the shaving knives in the proper taper of the shingles.

Fourth, The combination of the lever, P, with its pin, R, the projecting cam, S, and cam, g, on the frame, L L, for the purpose of communicating the requisite relative motion to the vibrating feed board, O, the driver, N, and frame, L L, whereby one bolt only at a time of the two, three or more riven by the froes, is driven outward, and forced through the shaving knives, no matter how short or thin the bolt may have been froed.

MAGNETIC PRINTING TELEGRAPH—R. E. House, of Binghampton, N. Y., formerly of New York City. Patent dated Dec. 28, 1852—Re-issued Sept. 28, 1858: I claim, first, The employment of force derived from an electro-magnet, to govern and regulate a force derived from the use of compressed air or other fluid, substantially in the manner and for the purpose specified.

Second, I claim an electro-magnet constructed substantially as described. that is to say, when made up of a series of hollow stationary and moving magnets, arranged substantially as specified, so as to effect the movement of a rod or axis on which the latter are mounted, substantially in the manner set forth.

Third, I claim a valve substantially such as is specified, in combination with any electro-magnet to move that valve, and a piston, or its equivalent, whose motions are effected by the pressure of air or fluid, whose action is controlled by such a valve, the combination being substantially such as specified.

Fourth, I claim an endless band, acting as a reservoir of coloring matter, and arranged substantially in the manner and for the purpose specified, in combination with paper and a series of types and a spurred cylinder, so as to record characters when pressure is applied.

Fifth, In combination with a key-board at one locality, and a printing apparatus at another, or in combination with both a key-board and a printing apparatus at each locality, I claim a detent or stop moved by the hand of the operator for arresting the motion of a type wheel at one determined and fixed point when there is combined therewith a key corresponding, the parts are in proper position with that determined and fixed point, the detent and key being substantially such as specified.

Sixth, I claim driving a type wheel of a printing apparatus by means of a friction connection substantially such as described, between it and a prime mover, so that the motions of the former may be modified, or its motions stopped without causing the motion of the latter to be stopped or modified.

Seventh, I claim combining with a wheel of a printing telegraph, which must at times stop, and at other times be in motion, a spring compressed by the action of the parts when in motion and exerting its force to start the wheel when released from any detent that may arrest its rotation, the combination being substantially such as to effect the purpose set forth, substantially as described.

Eighth, I claim causing the paper to be printed to approach the type which is to impress it, by means of a friction connection with a prime mover, so that the latter may remain in motion while the former is at rest, substantially in the manner set forth.

Ninth. I claim the apparatus substantially as set forth for governing the approach of paper to a type wheel, that at times moves, and at others stops, so that the apparatus which brings up the paper shall act for that purpose when the type wheel ceases to revolve for a longer period than usual.

Tenth, I claim, in combination with a type wheel of a printing telegraph, a spurred or toothed cylinder, substantially such as is specified, the latter causing the paper to progress, as the purposes of printing by the types on the former may require, substantially as set forth, and this I also claim in combination with another surface, substantially such as is specified to press the paper upon such spurs, in the manner substantially as described.

METALLIC PACKING FOR STEAM PISTONS—Daniel Lasher, of Brooklyn, N. Y. Dated June 30, 1857: I claim the bent or folded springs inserted between the piston and packing ring, and taking an even and extended bearing around the interior circumference of said packing ring to cause the said packing ring or rings to take an uniform bearing on the interior of said cylinder, substantially as set forth.

I also claim two or more tiers of packing springs placed between the piston and the rings as aforesaid, when the said tiers of springs are so placed as to occupy alternate positions or break joints, as set forth.

ADDITIONAL IMPROVEMENTS.

REVOLVING FIREARM—F. D. Newbury, of Albany, N. Y. Dated June 29, 1858: I claim in the construction and use of the trigger, the slot, f, also the feather, g, with the pin, p, substantially as described and for the purposes set forth in the specification.

CORN PLANTERS—Nathaniel Drake, of Newton, N. Y. Dated Feb. 2, 1858: I claim, first, The rib, b, attached to the upper valve, constructed and operating as shown and described for the purpose stated.

Second, Extending the chains which operate the valves down under the pulleys, d', back of the axle, so as to obviate the slackening and taking up of the chains by the vibrations of the plows, D, and their attachments, as set forth.

SWING BOLT FOR FASTENING SHUTTERS—J. Gunner, Jr., of New York, N. Y. Dated Sept. 15, 1858: I claim the attachment, J, Fig. 4. substantially as described, when used in combination with the lever, C', hub, E, and catch plate, D. for the purpose set forth.

Selling Future Inventions—Using Patented Machines.

We have received a letter from a correspondent who makes certain inquiries, (the nature of which are set forth in the above caption,) and as they relate to matters of deep importance to inventors, patentees, and assignees of patents, we will present them, with appropriate information on the subjects, in a brief article.

First—If an inventor and patentee assigns one half of his patent, and contracts in the assignment that *all* improvements on the machine secured in the patent, made thereafter by the inventor, shall belong to the party of the second part equally with the inventor and patentee, "would the assignee by virtue of his assignment have a legal binding claim on any new patent that might be granted to the inventor for an improvement in the machine, unless the claims were conveyed to him by a new assignment?"

A question of this very nature was decided in a trial before Judges Woodbury and Minot in October, 1845. The plaintiffs were John Nesmith and others against F. A. Calvert and others, to fulfill the agreement conveyed in an assignment giving the plaintiffs the right to all *future* improvements in certain machinery for preparing wool. The defendants had secured a second patent for improvements in the machine not embraced in the first patent. The court decided that a contract conveying a *future* invention was as legal and binding as one conveying a past invention. The decree was given in favor of the plaintiffs, and the inventor ordered to fulfill his contract, thus giving the plaintiffs a right to the improvements embraced in the second patent.

Second—"Can an inventor and patentee who has assigned one half of his patent be restrained by his assignee from using the machine covered by the patent in connection with an improvement secured by him in a subsequent patent?"

This is a question having reference to a *license* to use a patented machine, not an assignment. If the inventor, by the terms of his contract with his assignee, secured a license to run a machine on his own account, then he can alter it as he pleases, and use any improvement he chooses in connection with it. If the inventor has secured no such license, then he cannot independently run a machine covered by the assigned patent without the consent of his assignee, his joint partner in the patent. Were the case otherwise, assignments of patents would be of no force nor value, for if an inventor could run one machine in opposition to his assignee, he could upon the same principle run a thousand.

Recent Patented Improvements.

The following inventions have been patented this week, as will be found by referring to our List of Claims;—

BREAD MACHINE AND OVEN.—Messrs. W. R. Nevins and J. J. Yates, of New York, have invented an improvement in the machine for manufacturing loaf bread, ship biscuit and similar forms of this necessary article of food. The invention relates to machines for rolling dough into flat and continuous pieces, and conveying it on an endless apron under reciprocating cutters, by which it is cut into biscuit of any desired size and shape. The framework, to which is attached the oval or other shaped bar over which the endless apron passes, is extended beyond the frame of the machine, and over the hexagonal roller around which the metallic plates of the endless apron of the oven passes. The two aprons are given a corresponding intermittent progressive motion so as to enable the biscuit to be discharged automatically from one apron to the other, and an additional endless apron and rollers are placed above the endless apron for conveying the cut biscuit and scrap dough in such a manner as to separate the two after being cut.

The same inventors have also invented an oven for baking the biscuits, the improvement in which consists in arranging the endless apron for conveying the article to be baked within a horizontal chamber or oven having a metallic top and bottom, above and below which are horizontal flues communicating at their ends, for the passage of heated air, &c., from the furnace below; and dividing the lower flues and furnaces by a transverse bridge wall, in such a manner as to allow the heated air, &c., to be conveyed below the oven in both directions from the furnaces in the center to the ends, and then through the upper flue to the chimney. By these means an equable degree of heat is given to the upper and lower plates during the intermittent progressive motion of the endless apron which corresponds with the motions of the bread-making machine; and no smoke, ashes, or dirt can come in contact with the bread while baking. Both of these inventions have been patented abroad.

LAMP.—The object of this invention is to obtain a lamp by which the flame may be supplied with a large or requisite amount of oxygen, without the employment of the glass chimney which has hitherto been used for this purpose. This lamp, although it will burn any of the substances usually employed, is more specially adapted for coal oil and other highly carbonaceous materials which consequently require a large quantity of oxygen for their combustion. The inventor is W. H. Racey, of St. Augustine, Fla. It would require a diagram to explain its construction.

CRACKER MACHINE.—J. and J. C. Holyland, of Rochester, N. Y., have invented an improvement in the machines that are used for cutting out crackers from sheets of dough, and which are generally known as cracker machines. The invention consists in applying springs to rods which are connected with the cutter plate, so that the machine will be protected from all strain and the cutter plate made to act more efficiently than usual.

IMPROVED CAR SPRINGS.—These car springs are prepared by coating or saturating a webbing of knit fabric with vulcanized india rubber, the webbing is then wound upon a mandrel in the form of a scroll while in a green state, so as to produce alternate layers of rubber and knit cloth around the mandrel, and a vulcanized rubber car spring is produced which has a uniform horizontal and vertical yielding movement, and is at once cheap and perfect. S. Peatfield, of Ipswich, Mass., is the inventor.

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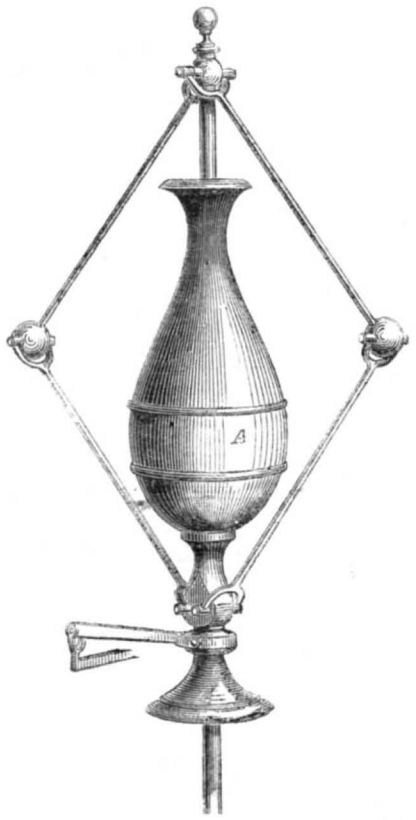
New Inventions.

Porter's Improved Governor.

The great want of the steam engine is a perfect governor. Something which can be relied upon to hold an engine always at the same uniform and steady rate of motion, however the pressure of steam may vary, or whatever sudden and extreme changes may be made in the load, is a desideratum which engineers have very generally believed would never be attained.



There are three requisites for a perfect governor. It must be extremely sensitive, so as to begin to open or to close the regulating valve instantly on the slightest variation in the speed of the engine; it must effect the whole movement necessary entirely to open or close the valve very rapidly; and a force must be developed by almost inappreciable variations in its speed sufficient to overcome all hindrances to its action. These requirements seem at last to have been met. The improvement in centrifugal governors illustrated in the accompanying engraving, if not absolutely perfect in its action, is so nearly so, as to leave in our opinion nothing further to be desired. The following account of the practical operation of one of these governors, under tests to which it was subjected in our presence a few days since, will speak for itself:—

It was attached to a common ten-horse power engine, with slide valves, and operated o. e of Judson's regulating valves. A pressure of ninety pounds of steam was required to run all the machinery driven by the engine, twenty pounds of which was necessary to drive the shafting when the machinery was thrown off. The engine was started with just ninety pounds of pressure, driving only the shafting. The stop-valve was set wide open, and remained so during the experiments. The engine ran very steadily, making one hundred revolutions per minute. After running thus for a few minutes, the entire load was thrown on simultaneously, and as suddenly as possible. No change in the speed of the engine could be perceived by the eye, but on carefully counting the revolutions it was found that they had fallen to ninety-eight per minute, at which rate the engine worked with a perfectly uniform motion. The whole load was then as suddenly thrown off. We expected to see the engine start away, but its steady motion was not apparently disturbed at all. The count, however, showed it to have returned to its former speed. This test was repeated several times with the same result.

Watching the governor when this severe demand was made upon it, we saw that such was its quickness that it had invariably completed its action before the change in the load, however suddenly made, could be effected; and we were therefore the less astonished, when, with the closest scrutiny, we were unable to perceive, for even a single stroke, any faltering or acceleration in the motion of the engine, when the entire load was thus thrown on and off.

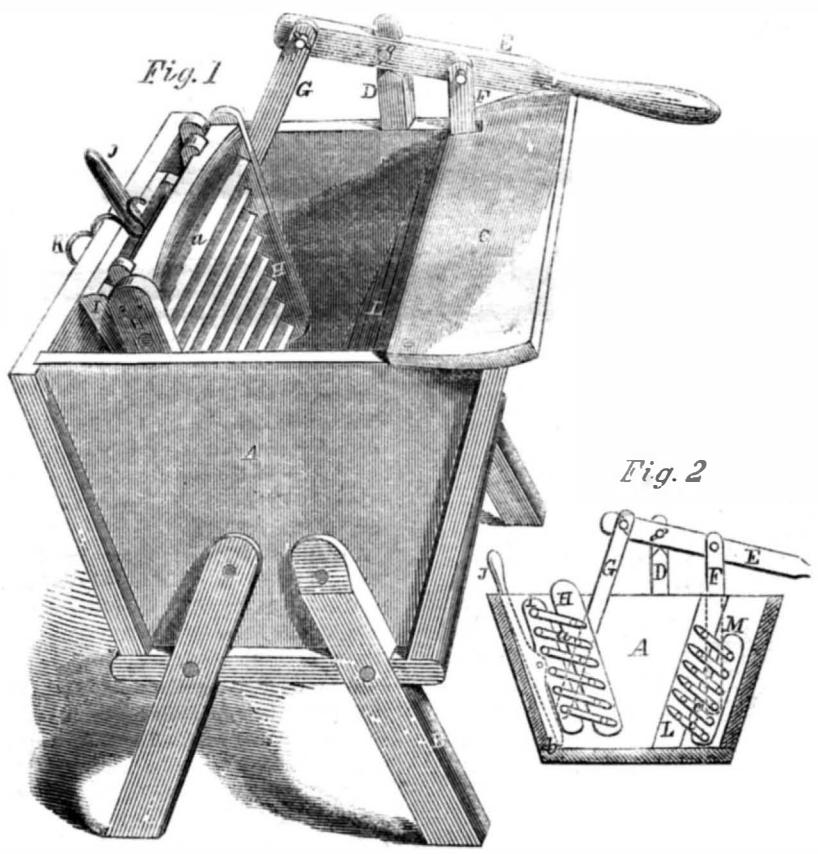
The steam was now raised to 110 pounds, without causing any change, except that under the full load, the speed fell only one per cent, instead of two per cent, as before. The engine was then stopped, and the belts removed, when it was started again with 110 pounds pressure of steam, and with no load at all even to steady its motion. Its speed was the same as before, 100 revolutions per minute. The steam was then run down, and the speed carefully noted. No change at all could be perceived until the pressure had fallen nearly to thirty pounds. It then began gradually to slacken, until with twelve pounds of steam the engine was making ninety-six revolutions.

At the highest pressure, after the belts were removed, a brake was applied to the fly-wheel, and loaded until the engine labored heavily. It was then suddenly thrown up, when the engine started considerably, and ran for about six revolutions before recovering itself. On the experiment being repeated, it was seen that the governor acted with its usual quickness, and that the acceleration of speed took place after the regulating valve was completely closed, and was caused by the steam in the chest, and passages beyond the regulating valve, expanding at its high pressure into the cylinder, where it met with no resistance. It was obvious that were this governor attached to a cut-off, even this extreme change would not affect the motion of the engine perceptibly. The pressure of steam was afterwards raised to sixty pounds, and all the machinery which could be driven at that pressure was thrown on and off with precisely the same effect as before.

These surprising results are attained by the use of the ordinary arms and balls, made very light, swinging from a single joint, the most sensitive possible arrangement, and revolving at a velocity about six times their natural speed. The centrifugal force thus generated sustains a considerable weight, A, which is required to hold the balls down to their desired plane of revolution. The appearance of this governor is such as to make it an ornamental appendage to the steam engine, and we think it will speedily come into general use, wherever steady power is an object.

It is the invention of Charles T. Porter, of this city, who has recently obtained patents for it in this country and Europe through the Scientific American Patent Agency, and who may be addressed for further information at 146 West Twenty-second street, New York. It can be seen in operation at No. 290 West Fourteenth street, near Tenth avenue.

PRICE'S WASHING MACHINE.



Very few persons now-a-days wash by hand, the number of washing boards and machines having demonstrated how much simpler and easier it is to wash by them than by hand, and consequently every new washing apparatus, however numerous they are, must arouse some attention on the part of our housewives and laundresses.

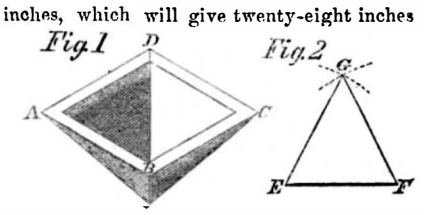
The one which is the subject of our illustration is the invention of Thos. J. Price, of Industry, Ill., and was patented by him Oct. 27, 1857.

The clothes are placed with water and soap in the tub, A, supported on legs, B, between the slats, *a* and L, by the rubbing action of the rounded edges of which the clothes or fabrics are washed. These slats, *a*, are placed like blind slats in a frame, H, and are moved back and forth by the lever, E, which, by being pivoted to a standard, D, rising from the tub and being also connected to the slats, *a* and L, by rods, G and F, gives them a vibratory motion against each other, when the lever, E, is moved up and down. The frame, H, can be retained to the side of the hub by a spring catch, K, when not in use, or can be pressed against the fabrics to rub them between the slats by the handle, J, attached to a frame which is hinged to the bottom of the tub seen at *b* in the section, Fig. 2. These slats are elongated at a portion of their backs, and this elongation is loosely attached to rods, M and I, to which the G and F, are also loosely connected so as to give the slats the necessary motion, which is one peculiarly adapted to washing, combining the rubbing action of the knuckles with the continuous certainty of a machine.

This is a very good washing machine, and further information can be obtained by addressing the inventor as above, or W. R. Downen, care of H. Fellows, San Francisco, Cal.

How to Construct a Five Bushel Hopper.

We have been requested by one of our correspondents to give instructions how to construct a hopper which will contain five bushels of grain, if one of the sides is three feet long. By the aid of the accompanying diagrams and explanation, the method will be clearly seen. Suppose the box is to be made of inch-boards and the sides are to be equal, the space inside one of the sides will be thirty-four inches, which will give twenty-eight inches



from the point where the boards join to the center of the square, A B C D, Fig. 1. Fig. 2 is one of the sides of the hopper, the distance between E F being thirty-six inches, and we have found by calculation that the sides, E G, F G, are to be 37⅞ inches long in order to make a hopper of the required size. It will be easy for any one possessing a pair of scribing compasses to lay out a triangle of the required size, by first drawing a straight line on his board, and measuring off 36 inches, and then taking 37⅞ inches in the compasses marking circles from E and F, and from the point of intersection, G, drawing straight lines to E and F. A bushel contains 2150.42 cubic inches, and a hopper constructed as described contains five times this quantity, the upper outsides being 36 inches long, the bevel making the inside 34 inches and the depth being 28 inches.

A Hard and Durable Soap.

A patent has been granted in England for an improvement in the manufacture of soap, by the addition of sulphate of lime to the usual ingredients employed in its manufacture. The sulphate may be added to the soap in a dry powder, or in admixture with any of the usual ingredients employed in the manufacture of soap. The proportions of the sulphate which it is best to employ, vary according to the article manipulated upon, and the quality of the soap to be produced. Thus about twelve ounces of dry sulphate is sufficient for one tun of best soap, whereas, in common or highly liquored soap, six or eight pounds may be used with advantage. Soap, made with the addition of sulphate of lime, becomes hardened, keeps dry, and is not liable to shrink while in water, its durability is increased, and it does not wear or waste away before its cleansing properties are brought into action.

Laying Submarine Cables.—Captain S. Samuels, of Brooklyn, N. Y., has invented a method of laying submarine cables, by passing them from the ship or other vessel from which they are to be paid out, through an opening in the bottom, as near as convenient and practicable, midway between stem and stern, where the least motion is produced by the pitching of the vessel. By this means the liability to break the cable is very much reduced, if not entirely obviated, as at a certain point in the center of a vessel's length there is comparatively little motion produced by pitching, so that the excessive and uneven strain or jerk which so much tends to rupture cables when paid out from the stern is here avoided, the danger being correspondingly lessened, and the cumbrous machinery and complicated mechanism of brakes and paying-out devices simplified and reduced. This idea has often been proposed, but Captain Samuels has been able to show the priority of his invention, and has, consequently, obtained a patent this week.

A Novel Feat.—At Amsterdam there has been a regatta of young men, who walk the water in shoes called *podoschapes*. Herr Oschner has accomplished the feat of walking up the Rhine, from Rotterdam to Cologne, where he arrived on Sunday, August 22d, having started from Rotterdam on the 16th.

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Scientific American.

NEW YORK, OCTOBER 9, 1858.

Comets.

During the early part of last year, the whole civilized world was agitated by a foolish prediction that a comet was about to appear, which would strike the earth at a tangent, and knock it into the condition of a tempest-struck hulk. The public press of Europe and America presented an immense spread of paper on the subject, and there was a convulsive time of it generally. The year 1857 passed away, however, without the expected wanderer of the skies making his appearance; and astronomers and the public settled down into the dull routine of common regularities, not anticipating any brilliant comet for some time to come. We have all been most agreeably disappointed. For some weeks past we have been enjoying nightly one of the most beautiful sights that ever appeared in the starry dome.

On the second of June last, an Italian astronomer named Donati discovered the present comet approaching slowly towards the sun, in a northwesterly direction, and it has been increasing in brightness—as all comets do—as it draws nearer old Sol. No fears are excited by its presence; it is gorgeous beyond language to describe, and is beheld only with a thrill of admiration. Like a streaming torch of silvery light, extending fifteen millions of miles in length through the heavens, it hangs evening after evening gracefully over the northwest sky. Its head resembles a ring, with a bright nucleus in the middle, or something like an illuminated globe, with its intense flame in the centre. The diameter of this ring, as measured by Prof. Mitchell, of Cincinnati, is 18,000 miles. It has been approaching the path of our planet, with the apparent intention of giving us a friendly brush, and on the date of this number of the SCIENTIFIC AMERICAN, it will have attained to its maximum brilliancy. It approaches the sun with its tail flashing behind it, and at a certain distance from the great luminary, it will suddenly turn round to the other side and *back out* of our planetary system in a contrary direction to that by which it entered. In 1843 a comet appeared far less bright than the present one, but its tail was reckoned to be 170 million miles in length. When it wheeled round the sun, it moved through its curved path with the velocity of the lightning's flash. In two short hours its immense tail swept through a range of no less than 3,740 millions of miles. From the flight of objects on earth, it is impossible to form a comparative idea of the awful velocities of comets and other heavenly bodies.

Of the composition of comets, the most learned are ignorant. They must be composed of some matter more subtle than anything with which we are acquainted on earth. Stars are clearly visible through this comet's tail, and it possesses little, if any, gravity. This is deduced from a large comet which appeared in 1799, and got entangled among the satellites of Jupiter. It was there arrested for several weeks, yet its attractive force upon the satellites was so limited as not to produce the slightest effect upon their movements.

In ancient times comets were believed to be prognosticators of *dire* events. One appeared when Julius Cæsar was assassinated; another when Constantinople was taken by the Turks; one during the terrible persecutions in the reign of Charles the Fifth; and another in 1811, when all Europe was deluged with war and bloodshed; but no intelligent person has any superstitious dread of their presence in this age. From what is known of the insignificant effect of the comet of 1799, it is reasonable to infer that were a comet to come in collision with our planet, it would produce no greater effect than the blast of a bellows upon the Rocky Mountains. Some men, however, of profound acquirements, have expressed their belief that our globe at one period was struck by a comet, and that in consequence of such a collision it was made to rotate on a different axis from that which it once had. M. Arago, the eminent French astronomer, however, denied that such a result had ever taken place, and he founded his deductions upon the fact, that the earth now turned on a *principal axis*, whereas had it been so struck, it would have turned on a different axis, one not passing through the poles of an oblate spheroid. All the planets revolve round the sun in one direction, but comets enter our system in every direction, and completely baffle the reasoning of philosophers to account for their actions. It is also unknown whether they are self-luminous, or shine with a borrowed lustre. Sir Isaac Newton believed they were feeders to the sun, and that they supplied that luminary with the matter, which, according to his corpuscular theory of light, the sun was continually projecting into space.

The present comet is a stranger to the living inhabitants of the earth; it may be the same as that which was witnessed ages ago, when our painted progenitors went forth to battle against the iron legions of Rome, but this is mere conjecture. It will soon depart from our vision to wander once more through the vast solitudes of unknown space, never, perhaps, to visit our system again. Who can tell but it may yet become a wreck among some of the stellar constellations while sailing through the boundless ocean of the universe?

Loss of the Steamship Austria.

One of the most awful accidents which has ever befallen an Atlantic steamer, has recently occurred—the burning of the *Austria*—by which about five hundred lives were lost and as many homes have been made desolate, by the want of a very simple thing called *discipline*. All our readers have, we presume, ere this, become acquainted with the details of the catastrophe, and it is now simply our intention to offer some comments on the sad disaster. With the ship herself, no fault could be found; she was well and strongly built, and divided into compartments by iron bulk heads, for extra safety, and she was, as the advertisements say, "fitted up with every regard to comfort, luxury and convenience." The captain and doctor thought that she wanted fumigating, and so two officers of the ship went into the steerage with a red hot chain and a bucket of tar; the chain was too hot, it dropped into the tar, which upset and in a few seconds the vessel was in flames. All was now hurry and confusion, the dreadful cry of "The ship is on fire" resounded through the ship, and panic-stricken, the passengers and crew aided in their own destruction. The captain and pilot, it is said, deserted their posts—we hope this is untrue—and the ship was given over to the advancing flames. The scene of horror which then followed we will not attempt to describe, for no pen has ever succeeded in depicting such sufferings as were then endured, but we will plainly ask why this method of fumigation was adopted. It must be understood that it was not as a disinfectant, but only to drive the sea-sick passengers out of their berths by the horrid smell, that the steerage might be washed and cleaned. This method is common on emigrant ships, and should be at once forbidden, as highly dangerous and of no more use than playing a good stream of water on the sick passengers would be. If they objected to vacate their berths for the purpose of cleansing, then let the berths be cleansed while they are in them, and they would soon more

Again, why were the women screaming, and whole families precipitating themselves into the yawning gulf of waters? Because their minds hightened the danger from want of other occupation. Were each passenger, steerage and cabin, taken at the earliest opportunity after leaving port, and shown their respective places in the boats and on rafts, and each assigned some special work in case of accident, then, the moment an alarm was sounded, self-preservation would dictate to every one to do the duty assigned them, and take without hurry or confusion their proper positions. Had there been any system at all on board the *Austria*, every life might have been saved, but for want of discipline *five hundred* lives have been lost. We must not merely sympathise with the sufferers and their friends or relatives, but must also derive from it the lesson which the Great Providence, who permitted the calamity, intended it to convey. That lesson seems to us to be the necessity of discipline among the passengers, and this appears in clearer characters when we recollect the burning of the *Sarah Sands*, in which all the lives were saved by the exercise of this simple thing. If our shipowners and captains will learn this lesson, then the five hundred persons who have perished will be recollected with grateful memory by every future passenger across every sea. We hope they may.

Tempering Wire and Steel.

Having had several inquiries in regard to the improved method for securing the above objects, for which a patent was issued to Henry Waterman, of Brooklyn, L. I., on the 24th of August last, we will give a brief description of its essential features. The specification solely describes its application to wire tempering. The wire to be operated is secured on the circumference of a broad wheel, which is provided with a tension brake. This wheel is placed at one end of a furnace, which has a hole in its wall, through which the wire is drawn, passing through the fire, then into a trough for tempering, containing oil, thence to the circumference of another broad-rimmed iron wheel, on which it is wound up. This latter wheel has a screw on its shaft, so that as the wire is wound it is taken up spirally, and the strands not overlaid. The coil of wire to be tempered has one end attached to an iron rod or thick wire, then drawn through the furnace, and secured to the winding-up wheel before operations are commenced. The fire for heating the wire must be bright and clear, the wire must not be overheated—a dull red heat being about the proper temperature—and the whole process must be conducted with great care.

The tension on the brake and take-up wheels takes out all crooks in the wire while passing through the fire, so that it is wound up smooth and evenly, and of the same curve as that of a guide bar placed in the tempering trough. A coil of wire any number of miles in length may be hardened in this manner. When the wire required for one operation is hardened, the wheels are removed from their position near the furnace, and the wire wound back, from the take-up to the delivery wheel, passing through clean warm sawdust, to remove the oil. The temper is then reduced or *toned*, by placing the wire in a heated oven, and revolving it on the wheel till the desired uniform and elastic temper is secured.

The Atlantic Telegraph Cable.

No signals have been transmitted through the cable for some time, and it is asserted that there is a leak in it about two hundred miles west of Ireland, where the water suddenly becomes very deep, the cable passing down the side of a submarine mountain. Wherever the leak is in the cable, it is mere conjecture to assert that is here or there—one mile or two hundred miles from Ireland. No person can reliably tell without lifting the cable.

UNKNOWN MODELS.—We have several models now in our office from sources unknown, therefore we cannot write to their inventors. This oversight is a cause of much inconvenience to us, and no doubt the delay in our response to the wishes of the inventors thus situated is annoying to them. We wish to be very prompt in attending to all cases submitted to us; and if those who send models would just attach their address in some way to them, it will save mutual trouble and delay.

Fair of the American Institute.

The produce of the manufacturing arts and the operations connected with their development, are objects of interest to every sensible mind. The subtle mechanism, and the intricate, yet graceful motions displayed by some machines, afford wonderful examples of inventive genius applied in the best manner to secure useful results. Industrial exhibitions, therefore, are calculated to please and instruct those who visit them. The present Fair of the American Institute is not equal to some of its predecessors in regard to the number and variety of articles displayed, but the peculiar novelty of some of these, also the public display of operations in some of the arts—never before thus witnessed—more than makes up for the absence of some things less important to the public.

SILVER PLATING.

Articles denominated "Silver ware," are usually very beautiful. The artists engaged in this branch of manufacture generally display a refined taste in the classic form and exquisite ornamentation of their productions. There are very few articles, however, of this denomination which are made of solid silver; the mass of them are composed of a body of an inferior metal, such as brass, or tin and copper, having their surfaces merely coated with a thin cuticle of pure silver. These articles are termed plated ware. The old process of plating consisted in laying thin leaves or sheets of silver on the clean surface of articles made of brass, then partially fusing the two metals together in a furnace, after which they were pressed together and burnished. This process is called fire plating, and is still practiced for many purposes; but the great mass of silver plated articles now produced have their bodies made of white metal (mostly tin), and their surfaces coated with pure silver, by lightning-electricity. It was early discovered by Sir Humphrey Davy, that a *quantity* current of electricity from a battery would deposit pure metals from their moist oxydes. This was soon afterwards applied to deposit silver, gold and copper from their solutions, and thus to cover—by a very perfect union—the surfaces of articles of an inferior metal. If an article of tin, such as a vase, or a teapot, is connected with one pole of a Smee's battery, and placed in a solution of silver—such as the silver cyanide of potash—and the other pole of the battery brought into the galvanic circuit, the whole surface of the tin vase will soon be covered with a thin coat of pure silver, precipitated upon it by the electric current. The vase is then taken out of the solution, and is thoroughly washed in soft water. In appearance, it is a dull white, but by a burnishing tool rubbed over its surface, it is rendered bright and shining. This is a brief description of the process of electro-silver plating, which is now carried on so extensively in our country, and which is but a very few years old. It is exceedingly simple, and is one of the most useful applications of electricity. All the operations of this beautiful art are publicly conducted at the Fair, in the East nave, by artists from the establishment of Haughtwout & Co., corner of Broome street and Broadway, this city.

KNITTING MACHINES.

Progress is the watchword in this inventive age. This is exemplified in a number of very ingenious knitting machines or looms, exhibited by J. B. & W. Aiken, of Franklin, N. H. A stocking machine resembles a large ring, having a revolving top plate, and a number of under hooks, moving back and forth towards, and from the central opening to receive the thread or yarn from a rotary ring traveler, to form the loops, interlace them, and then throw them off in the form of a long knit tube hanging down in the centre. To produce a ribbed knit fabric, two sets of needles are required, the one set working vertically through, and transverse to the loops formed by the other set; one set of needles only are required for plain work. A large machine for knitting shirts has five feed bob-

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bins, and a stop motion for each, so that the break of a thread at once stops it. It is a most ingenious loom, and will knit 50 yards in one day.

A stocking loom occupies no more space than a common sewing machine; but one is required for knitting the legs and another the feet. The work of the former is taken off in the form of a long tube; this is cut in proper lengths, put on the footing machine, which weaves a single square piece to the leg, and this is closed by crotchet work by hand to form the foot. One girl can attend eight looms, and produce 100 dozen pair of stockings in a factory every day. They are the most perfect machines for this purpose we have yet examined, and no less than five patent are em braced in their operation and construction. The cost of a machine to knit ribbed stocking legs, is $200; one for feet, $100; a family machine for plain work, $50.

SEWING MACHINES.

The interest manifested in these machines seems to continue unabated, and the competion among the makers and sellers of them is maintained with unflagging zeal and energy. No less than nine different classes of these iron stitchers are on exhibition by as many different parties, and each, it is stated, possesses peculiar and valuable features. Such a variety appears to countenance the prevailing opinion that the sewing machine business has become an important American institution. The names of the parties exhibiting are Bartholf, Grover & Baker, Wheeler & Wilson, Ladd & Webster, Fincle, Weed, and the National Sewing Machine Company. All these hold out their shingles in that important thoroughfare, Broadway. The other two are W. B. Bishop, of Brooklyn, N. Y., and J. M. Willcox, Philadelphia.

GLASS STEAM ENGINE.

The lovers of unique and novel art applied to engineering, cannot but be surprised with the exhibition of a glass beam-steam engine, working away with the utmost precision and beauty of movement. This curiosity is on exhibition in the South gallery, and is the first working steam engine made of glass ever brought before the public, we believe. The different parts are of various colored glass, and the ornaments and finish, would paralyze all the workers of iron to imitate. The very crank pin, and every journal in it is of glass, and the ingenuity and skill displayed in its production, are of no ordinary character. All the parts, we were informed, were spun by hand, by the blowpipe and a spirit lamp. There are several glass spinners conducting their operations ajacent to this engine. This business seems to be on the increase, as one of the ornamental *and curious arts*.

The Machine Department is not in full operation, nor are the arrangements all completed.

The Refreshment Department, which has hitherto been much neglected, is this year very admirably provided with all the necessary eatables and drinkables, under the competent management of Mr. Treadwell.

Something for our Railroad Companies to Think About.

Between the 7th of September, 1835, and the 31st of December, 1836, the number of railroad passengers in France was 224,345,-769. Of this number 1,979 were injured, and 999 killed—in all, 2,978. It is worthy of remark, that of these accidents 1,134 only—334 killed and 800 wounded—arose from defects in the working of the railroads; while 1,844—665 killed, and 1,179 wounded—resulted from individual imprudences, which were not attributable in any degree to the railroad companies. Taking away the agents and servants of the companies, the number of passengers killed by the working of the trains is but 111, that is, 1 in 2,021,133; and of passengers wounded, 402—1 in 558,074. Unfortunately for English management, this is a more favorable return than can be shown by any railroad company in England, and it behooves the Board of Trade to direct their attention to these French facts. So says a British journal, and so say we, in reference to the railroads of this country.

From a personal scamper through Belgium in 1855, we can state that the railroads of that country are admirably managed. The guards have a semi-military uniform, and the cars are started by the blast of a musical trumpet. In a long train there are two trumpet calls, one of which says, "All right at my end," and another, "All right at mine; so off we go." Sometimes the engine starts off with a clumsy attempt at a laughing chorus, but generally breaks into a wrong note, and is too glad to smother its blunder in the puff puff of its steam and the whirr of its wheels. Then there is another peculiarity of the Belgian and German trains, namely, that by means of a strong bar fixed to the side of the carriages, the guard is enabled to make his way along the wooden step from one to the other of the train; he does this repeatedly, collecting tickets where they are due, and ascertaining the destination of each of his passengers, so that, after a few visits, he knows them all by heart, and gives them the instructions they may chance to require. "You get down at the next station," he says to one; "You change cars when we stop," he says to another; and then, if there be any questions to be asked, the traveler obtains every information, most civilly bestowed, from the guard of the train. The guard commences his visits the moment the train is in motion, which enables him to see that all is right.

We would not purposely do injustice to our railroad system, but that there is something radically wrong in its general management is self-evident, and its managers can profitably study European systems.

Weaving by Machinery.

The improved mechanism by which the gigantic cotton mills of the present day are carried on is most varied and ingenious in its construction. There is, for instance, the winding machine, by which the yarn is wound on large bobbins; there is the beaming machine, by which the yarn is transported to large beams or rollers; there is the dressing machine, by which the yarn is drawn out into parallel lines of warp thread, and stiffened with an application of flour paste; and lastly, there are the looms—power looms for the great factories, and Jacquard looms for the more abstruse figured goods. Steam unwinds the warp from the beam, steam raises the alternate thread to form the shed or opening for the shuttle, steam drives the shuttle from side to side, steam drives up or consolidates each thread of weft as it is thrown, steam winds the calico or cloth on a large roller, and steam rings a bell to tell the attendant how the loom is getting on with its work. The attendant really does none of the weaving; she (for it is generally a female) watches a couple of looms alternately, to see that the beam has enough warp, and the shuttle enough weft, to mend any threads which accidentally break, and to make a number of little minor adjustments; but the giant power of steam—that power which will forge an anchor or make the eye of a needle—moves everything, does everything. In short, so far as regards the bulk of cotton goods now produced, steam power is the opener, the scutcher, the corder, the lapper, the drawer, the rover, the spinner, the doubler, the winder, the warper, the dresser, the weaver—he is the master workman, and the several machines actuated by his direct agency are his fingers.

HOOPING COUGH.—Great numbers of children laboring under hooping cough now visit the gas works in Preston, England, for the purpose of breathing the exhalations from the gas lime. It is said that all the little sufferers feel considerably relieved, and many are absolutely cured by this simple remedy.

First Suggestion of an Electric Telegraph.

While it is generally conceded that Professor Morse was the first to bring the application of electricity to telegraphic purposes from the region of speculative theory to that of practical operation, it is not so clear to whom the world is indebted for the first suggestion on this subject. M. Ampere, the celebrated French electrician, did much to give the problem a practical solution, but from the following extract from the London *Mechanics' Magazine*, of as old a date as April 17th, 1830, it would appear the idea of applying this wonderful agent to the transmission of messages was not new with him. The magazine says:—

"M. Ampere, who has acquired so much distinction by his electro-magnetic researches, proposes to establish, by means of voltaic currents, a system of telegraphic communication between distant places, which, if found to answer in practice, will be of unrivaled celerity, and of equal efficacy in all weathers. The idea of applying the electric fluid to this purpose is not new, but its revival by an individual of such high authority in this department of science as M. Ampere, is likely to obtain for it a degree of consideration greater than it has ever before, perhaps, received."

Ampere, who died in 1836, was distinguished above all others of his day for the experiments and extraordinary developments made by him in electro-magnetism, and there is no doubt that from his direct suggestions arose the idea of our present telegraph. How long anterior to the date of the suggestion mentioned, the idea of applying electricity to telegraphing was first proposed in Europe, we do not know, but we have evidence of the fact, on the authority of the Hon. Ellis Lewis, of Pennsylvania, that Professor J. R. Cox, of Philadelphia, as early as 1816, in a letter written to a scientific gentleman in London, expressed the opinion that electricity would in time be used as a means of establishing telegraph communication between distant points. This remarkable letter contains the following:—

"I have contemplated this important agent (electricity) as a probable means of establishing telegraphic communication with as much rapidity, and perhaps less expense, than any hitherto employed. I do not know how far experiment has determined galvanic action to be communicated by means of wires, but there is no reason to suppose it confined as to limits, certainly not as to time. Now, by means of apparatus fixed at certain distances as telegraphic stations, by tubes for the decomposition of water, and of metallic salts, &c., regularly arranged, such a key might be adopted as would be requisite to communicate words, sentences, and figures, from one station to another, and so on to the end of the line. However fanciful and speculative, I have no doubt that, sooner or later, it will be rendered useful in practice. JOHN REDMAN COX."

Philadelphia, 1816."

Indian Steel.

The steel made in India is of such good quality that not only are Indian swords made from it, but the best of Persian swords likewise; and it is believed that the vast monuments of ancient Egypt must have been cut with tools made of Indian steel, in respect to the hieroglyphics on the intensely hard porphyry and syenite.

This Indian steel appears to be made from the magnetic oxyd of iron. The ore is stamped to fragments, and the adherent quartz is separated by washing and sifting. The smelting is effected in the most intimitive way; the furnace is built of clay, and not more than four or five feet high; the bellows is formed of two goat skins, with a bamboo nozzle, tipped with a clay tube at the end which is to be nearest the fire; the fuel is charcoal. The iron produced by the appliances is such as our manufacturers of steel would treat with but little favor, but the Hindoo manages to obtain most excellent steel from it. The iron is heated to a low red heat, and is beaten for a long time with stone hammers on a stone anvil, the Hindoos having an opinion that iron implements are injurious. To convert this hammered iron into steel, it is broken into small pieces, and put into small crucibles with a little dry wood; the crucibles are stopped up with clay, and are put into a furnace, where they are entirely covered with charcoal. A blast is then applied for two or three hours, the crucibles are removed, allowed to cool, broken, and the metal, in the proper state to be fabricated into any desired form of article, removed.

Complimentary.

We believe that there are few persons who do not rejoice to know that what they undertake to perform for others is appreciated. It is a pleasure to have such services acknowledged to be satisfactorily and properly accomplished; and if such a feeling be indicative of a slight tinge of a business-like vanity, we are not ashamed to confess to the "amiable weakness," and to say that it gives us pleasure when our clients express their gratification to us in such terms as the following:—

Messrs. Cridge, Wadsworth & Co., writing from Pittsburg, Pa., say:—"We are much gratified with your success with our patent business. We cannot conceive how anything could be more efficient and complete for securing the rights of inventors, and bringing them favorably before the public than through the medium of your agency and your valuable journal."

Mr. N. T. Spear, of Boston, Mass., writes to us under date of September 16th, acknowledging the receipt of his Letters Patent, and adds: "I have not time to say all the complimentary things I feel prompted to express this morning. It is a pleasure to do business with your agency, and to recommend it to others."

From Cincinnati, Ohio, Mr. J. C. Macdonald writes to us on September 17th, saying: "I received my Letters Patent yesterday, and return you my sincere thanks for the prompt manner in which you have conducted the business through all its stages. When I have further business with the Patent Office I shall not fail to avail myself of your valuable assistance."

Mr. C. P. Stanford, of Mount Gregory, Cal., says:—"I have just received my Letters Patent. I did not expect it so soon—indeed, I had concluded not to look for it seriously until the 1st of January, so you may judge of my surprise at its coming to hand four months sooner; and the surprise was equaled by the satisfaction I felt, and I could not help shouting "Hurrah for Munn & Co. and Commissioner Holt!"

From Hazelton, Pa., Mr. J. P. Evans writes on September 23d:—"The only tribute I have now to offer you is my heartfelt thanks for the speedy and intelligible manner you brought my case through the Patent Office."

D. R. Knowles, of New London, Conn., on September 24th, acknowledges the receipt of his Letters Patent, and says:—"I embrace this opportunity to thank you for the prompt and satisfactory manner in which you discharged the business of making the application; and should I in future need a like service, I shall not forget your office."

These are but specimens of the many similar ones which we daily receive, and the flattering terms in which our clients speak of our system of transacting their patent business.

Rolling Tapered Steel Springs.

An English patent has been secured hy J. B. Howell and J. Shortridge, for an improved mode of rolling steel springs by the employment of a pair of rolls, arranged in the usual relation to each other, one of which is turned eccentrically, and the other plain. By this means the spring is rolled out, bevelled, or tapered at each end at one operation, and a series of springs produced, according to the length of the bar of steel passed between the rolls.

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Notes and Queries

*** Persons who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

C. F. A., of Mass.—The best way of honing down a razor is on an Arkansas stone, with a little sweet oil. We are not acquainted with the blacking you mention, but a good one may be made as follows:—Ivor black, 20 ounces; molasses, 16 ounces; linseed oil, 5 ounces; sulphuric acid, 3 ounces; indigo, 2 drachms; mucilage, ¼ ounce. Mix the molasses and black well, and the other ingredients with as much water as may be required.

Sand in Paper Rags.—A company in Boston lately purchased sixty bales of rags, which were stated to have been imported from Egypt, and obtained from mummies. Suspicious that they were rather heavier than they ought to be, they submitted them to a good threshing, and obtained 13,000 pounds of sand from the lot. The company refused to pay for the sand, and their claim was allowed by the parties from whom the rags were purchased. The Egyptians are a keen set of sharpers, but they can't throw dust in the eyes of the Yankees.

How to Tin Cast Iron.—If the articles are of such a form that they cannot be filed down, they must be scoured bright, and perfectly freed from oxyd and dirt, with sand in dilute sulphuric acid and hot water, after which they are washed, and placed in soft warm water. Some zinc must now be melted in an iron vessel, and its surface covered with ground salammoniac. The iron articles are now dipped, and kept in this for five minutes, after which they are lifted out, and plunged in another iron vessel containing molten tin. In five minutes they will be covered with a coat of tin, and are ready to be lifted out. It will facilitate the zincing process if the articles are plunged into a solution of salammoniac before being dipped in the zinc. Wrought iron does not require to be zinced before it is tinned; by decarbonizing cast iron it can also be tinned without zincing.

J. W. H., of Ala.—About sixteen years since a company was formed in this city to apply the balloon principle to steamboats, to buoy them in the water, and were intended to run from New York to Albany at the rate of fifty miles per hour. A boat called the *Dove* was to be built for this purpose, but the scheme of the enthusiastic projector began and ended on paper.

A. B. C., of Iowa.—The cheapest way to obtain the silicate of soda is to make a strong caustic lye with equal parts of quick lime and soda ash, then subject the silica, in a finely subdivided state, to the action of this lye in a close vessel at a boiling temperature.

T. Y., of Iowa.—We have received the rude specimen of paper which you state was manufactured by the natural action of the Mississippi water. We regret that you did not send us your theory of its formation, as it would, no doubt, have been interesting.

M. C. T., of N. Y.—The method you propose for preventing the malaria exhaled from marshes from entering dwellings, by using window frames packed with some material to strain the malaria, is not altogether new. In Vol. IX, Sci. Am., page 280, we published an article taken from a London journal, in which the same theory is set forth, the only difference being in the materials employed for this purpose.

Heat and Water.—There are some peculiar phenomena connected with heat and water. If a ball of low red-hot iron is placed in a vessel containing cold water, the latter is agitated violently. If we take a ball of molten glass on the end of a glass-blower's rod, and introduce it into the cold water, it will produce no agitation—the water will remain for some time quiescent. It would naturally be supposed that the higher heat of the glass would cause a more violent action in the water than the lower heat of the iron, but such is not the case. When the glass is cooled to about half its highest temperature it agitates the cold water vehemently.

G. L. B., of Me.—It has been asserted that the warm moist breezes which flow up the Mississippi valley from the Gulf of Mexico, generate our thunder storms, and that they are carried by western breezes to the Atlantic seaboard. This is the only theory we have heard suggested why thunder storms very often arise in the West.

Grapes.—Doctor Underhill, who has probably devoted more attention to the cultivation of the grape than any other person in this vicinity, gives the following rules for the eating of this wholesome fruit:—If a person is in perfect health, he should swallow the pulp only, ejecting the seed and skin. If constipated, he should swallow both the pulp and seed, ejecting only the skin. When the bowels are too relaxed, the pulp and skin may be swallowed, ejecting the seeds. The above hints are seasonable, although we would not recommend the taking of too much of the skin of the grape into the stomach.

To Improve Plaster Casts.—Plaster of Paris busts and figures may be made to have the appearance of polished marble by the following process:—Put into four pounds of clear water, one ounce of pure curd soap grated and dissolved in a glazed earthen vessel; then add one ounce of white beeswax, cut into thin slices; as soon as the whole is incorporated it is fit for use. Having well dried the plaster figure or bust, &c., before the fire, suspend it by a piece of string, and dip it at once in the varnish; upon taking it out, the varnish will appear to have been absorbed; in a few minutes stir the varnish, and dip the plaster a second time—this usually suffices. Cover it carefully from the dust for a week, then with a soft muslin rag, or some cotton wool, rub the figure gently, when a fine gloss will be produced.

Ditching Machines.—We have latterly had a great number of inquiries from the southern and western portions of our country for ditching machinery. Some patents have been taken on machines for this purpose, and engravings and descriptions of several may be found in the back volumes of our paper: but it seems that there is a greater demand than supply for this kind of machinery at present. We would suggest to inventors that this is a good field for their ingenuity. If there are any manufacturers of such machines, they would find it to their interest to advertise them in the Sci. Am.

Megascope, of N. Y.—Your communication upon the megascopic camera contains personal reflections, such as we should not wish to publish; it is, therefore, rejected.

T. W. C., of New Orleans.—We have no positive recollection of your communication signed "Yellow Fever." Please to repeat it. The idea seems not to be a bad one.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, October 2, 1858:—

R. H. M., of N. Y., $25; A. McV., of Ohio, $25; D. W. C., of N. Y., $30; M. B., of La., $55; N. B. P., of Conn., $30; J. F. C., of N. Y., $20; S. Y., Jr., of Pa., $25; E. A. J., of N. Y., $32; J. E., of N. Y., $55; G. H. M., of N. Y., $30; J. E. R., of Ill., $25; W. H. B., of Ala., $30; R. & S., of N. Y., $30; T. J. S., of La., $30; C. C. B., of Wis., $55; A. S., of N. Y., $25; D. & K., of N. Y., $50: E. G. B., of Conn., $37; W. & N., of Ill., $25; G. E. S., of N. H., $25; J. E. S., of Me., $32; E. M. J., of Conn., $25; W. H., of Mass., $60; F. & M., of Mass., $30; P. K., of Ill, $55; F. & B., of Wis., $30; D. V. of Ohio, $30; A. L. H., of N. Y., $30; A. F. R., of Ill., $25; C. W., of N. H., $40; G. L. D., of Pa., $20; E. M. & J. E. M., of N. Y., $25; N. P., of N. Y., $100; P. C. F., of N. Y., $25; L. R., of Pa., $55; J. F., of Mass., $25; W. Y. H., of Ill., $25; T. H. K., of Ga., $5; H. B., of Pa., $25; J. A. E., of N. Y, $30; E. M., of N. Y., $25; J. M., of Ohio, $30; D. S., of Cal., $35; C. E. B., of N. Y., $25; J. S. R., of Conn., $30; H. T., of N. Y., $30; C. T. P., of N. Y., $250; J. F., of Ky., $55; W. & J., of Ill., $55; E. W., of Mass., $35; W. W., of N. Y., $22; C. & H., of Ohio, $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, October 2, 1858:—

W. Y. H. of Ill.; R. H. M. of N. Y.; E. W., of Mass.: A. S. of N. Y.; E. M. of N. Y.: J. E. R. of Ill.,; J. C. N. Y.; J. F. of Mass.; H. K. of Ill.; H. S. of N. Y.; P. C. F. of N. Y.; A. F. R. of Ill.; E. L. E. of Conn.: C. & H., of Ohio; G. E. S. of Me.; P. H., of Ohio; G. H. M. of N, Y.; W. W. of N. Y.; S. Y., Jr., of Pa., D. S. McN. of N. Y.: G. B. of Ct.; W. W. L., of Ohio; H. B., Pa.; W. H. C., of Wis.: E. M. J., of Conn.; C. E. B. of N. Y.; E. M. & J. E. M., of N. Y.; J. W. M., of Pa,

Literary Notices.

Mrs. Putnam's Receipt Book and Young Housekeeper's Assistant. Boston: Phillips, Sampson & Co. This well-known collection of useful household receipts has just attained its eighth edition, which demonstrates the popularity and utility of the work. In this edition numerous bills of fare are added, and it is just the book which every one who likes their meals well cooked (and who does not?) should have.

North British Review—The number for the present quarter of this profound Review contains twelve able essays; one on the "Researches of Light," we believe, is by Sir David Brewster, the ablest living writer on such subjects. The other articles embrace various topics—history, religion, and politics. This, with all the British Reviews, is published by L. Scott & Co., No. 54 Gold street, New York. They also publish "Blackwood's Magazine,"

VALUABLE HINTS TO OUR READERS.

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Patent Claims—Persons desiring the claim of any invention which has been patented within fifteen years, can obtain a copy by addressing a letter to this office, stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying.

Binding—We would suggest to those who desire to have their volumes bound, that they had better send their numbers to this office, and have them executed in a uniform style with their previous volumes. Price of binding 75 cents.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the Scientific American, continue to procure patents for inventors in the United States and all foreign countries on the most liberal terms. Our experience is of thirteen years' standing, and our facilities are unequaled by any other agency in the world. The long experience we have had in preparing specifications and drawings has rendered us perfectly conversant with the mode of doing business at the United States Patent Office, and with most of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between nine and four o'clock, daily, at their principal office, 128 Fulton street, New York. We established, over a year ago, a Branch Office in the City of Washington, on the corner of F and Seventh streets, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at our office.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the principal office or either of the branches.

The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents:—

Messrs. Munn & Co.—I take pleasure in stating that while I held the office of Commissioner of Patents, more than one-fourth of all the business of the office came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

Yours, very truly, CHAS. MASON.

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Science and Art.

Compasses in Ships.

Many persons, and among the number, seamen, embracing most commanders of vessels, we understand, entertain the notion that the magnet or compass is not affected by local attraction, like a cargo of iron, if the latter is covered with some non-conducting material, such as dry tarpaulin. This is a great error, and one which we have no doubt has been the means of causing many fatal mistakes in navigation. Magnetism is different from a current of electricity in the important particular, that the attraction of the former is not affected by the interposition of glass or an insulating material. Place a magnet or compass inside of a glass vase, and it will be affected by the presence of iron on the outside of the glass, just as if there were no such medium between them. The atmosphere itself, if dry, is a superior non-conducting medium to glass, therefore the interposition of a tarpaulin (laid on the top of iron) between the compass and attractive cargo, is of no use whatever.

There is one method, however, of obviating local attraction to a great extent on board of vessels, and it can be brought into use by every sea captain, that is, to remove the compass as far as possible from the cause of local attraction. Thus, if it is found that the compass is affected by the presence of an adjacent body of iron, if the latter cannot be removed to a greater distance, then take the compass away from it. If it is attracted by a cargo of iron, remove the compass to some position as high up on the mast as possible; and it is our opinion that every ship should carry a compass on its mast as well as one on the quarter-deck.

The attraction of magnetism is inversely according to the square of the distance. Thus, if the force of magnetic attraction is equal to four pounds at the distance of one foot from the magnet, it is but one pound at the distance of two feet. From the consideration of this law of magnetism it will easily be perceived that the greater the distance between the object of local attraction—such as a cargo of iron, the hull of an iron vessel, or the engines of a steamer—the disturbance of the magnet's true action is greatly lessened in proportion.

New Potato Planter.

In planting seed potatoes it is desirable that they should be deposited in the freshly-opened furrow at regular distances apart, and instantly covered by the freshly dug earth and manure; and the object of the machine of which we give a perspective view in the accompanying engraving, is to accomplish these results by the action of cheap and simple devices, not likely to get out of order.

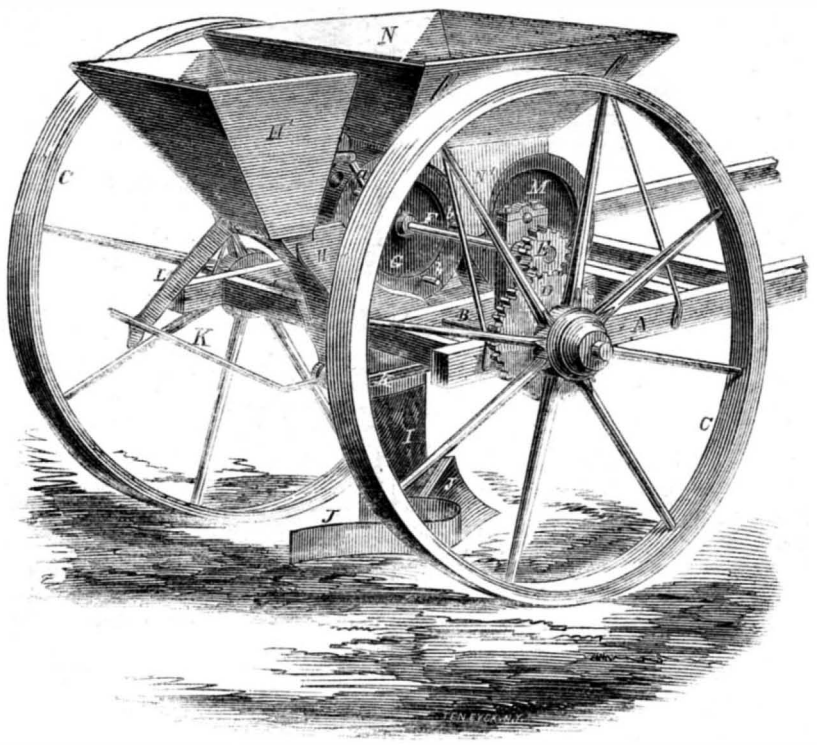
A, in the engraving, represents a horizontal frame, provided with suitable shafts for drawing the machine, and sustained on a shaft, B, on whose ends turn traveling wheels, C, to the hub of one of which is secured a cog wheel, D, meshing in gear with a pinion, E, immediately above, secured on the end of a horizontal transverse shaft, F, turning in suitable boxes secured to the frame, and having a planting wheel or roller, G, attached to its opposite end. To the frame, A, in the rear of the planting wheel, G, is secured an inclined trunk, H, communicating with the upper end of a canvas or other tube, I, terminating immediately behind the mold board of a plow, J′, from which extends a covering blade, J. This plow can be raised or lowered to regulate the depth of furrow, or to entirely clear it of the ground, when it is desired to transport the machine from place to place on its wheels, by means of a bent lever, K, which, when the plow is raised, can be fastened in a notch formed in an elastic bar, L, secured to the hopper, H′. This hopper is for containing gypsum, phosphate of lime, bone dust, or other compost, and it is arranged above the trunk, H, and is provided with a rising and falling gate in the front part of its lower end, to which is attached the end of a bent lever, *a*, turning on a fulcrum at its bent portion, and extending downward tangentially to the planting wheel or roller, G, in such a manner as to cause this lower end to be operated upon by pins, *b*, projecting from the side of the said planting wheel or roller, G, during its revolutions, and to raise the gate, and allow the escape of a certain quantity of compost from the hopper into the trunk, H, and tube, I, upon the passage of each pin, *b*, in front of the bent lever, *a*, the sliding gate being closed by its own gravity, as soon as its bent lever, *a*, is disengaged from the said pins, *b*.

Directly in front of the planting wheel, G, is arranged another wheel, M, whose periphery is in contact with the periphery of the planting wheel, so as to enable the two to turn together, and immediately above the portions of these wheels next each other is secured a hopper, N, on the front part of which is secured a knife, whose cutting edge is brought in tangential relation to the periphery of the planting wheel or roller, G, so as to cut off any portion of the seed potatoes in the openings or indentations of the same, and thereby bring them to one uniform size.

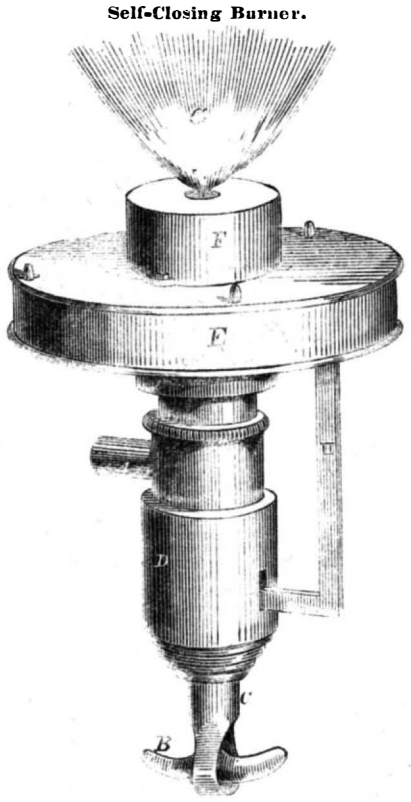
This is a compact, ingenious, and useful machine, and by the simple alteration of the pockets or indentations in the periphery of the planting wheel, G, and other parts, it can be adapted to planting corn, beans, and other seed. It can, moreover, be transported on its wheels without operating the planting wheel and other parts, by detaching the pinion, E, from gear with the cog wheel, D, and if desired, the planting wheel can be operated without moving the slide in the hopper, H′, to drop compost therefrom.

A patent was issued for this invention on the 9th of February, 1857, to E. E. Hawley, of New Haven, Conn. Any further information can be had by addressing this gentleman or R. N. Hawley, at that place.

HAWLEY'S POTATO PLANTER.



Self-Closing Burner.



Many very serious accidents have arisen from careless manipulation of the gas cock, and fatal explosions have frequently resulted from taking a light into a room full of gas. Persons have also been suffocated by sleeping in rooms where gas has been leaking all night, and notwithstanding the very general use of gas as a means of illumination, there are yet very many innocent persons who are not aware of its nature, and often when, for the first time, they see a gas burner in their room at an hotel, before retiring for the night they *blow* it out, being totally unaware of the use of the cock. With pleasant dreams they fall asleep, and the visions of the night gradually take the shape of a kitchen—cooking is going on—the cook becomes drowsy—the meat burns—and the slumberer awakes with the unpleasant sensation of an actual, not imaginary, bad odor being diffused through his room. The first thought is the gas, nightcap, stockings, pantaloons—anything to tie it up—and again *rusticus* retires to the arms of Morpheus, dozing off with thoughts of the wonderful inventions which are used in cities. This is no ideal case, but one that can be corroborated by the experience of nearly every large hotelkeeper, and many housekeepers who have had friends staying with them who did not understand the nature of gas. We had a country clergyman staying with us on one occasion, who blew the gas out, and the moment his wife perceived the smell, she jumped out of bed, and with frantic energy tied her nightcap over the burner, and then, thinking all was safe, she retired to rest.

It needs no assurance from us to convince every one of the extreme danger of such accidents, and we are happy to be able at the same time to point to a gas burner which will close itself the moment it is blown out, so that no accident can happen from the ignorance of individuals, or the light being extinguished by a sudden draft.

Our illustration is a perspective view of it, in which A is the branch pipe which supplies the gas to the burner; F is an air chamber flush and smooth with the top of the burner, and E is a case containing some mechanism. When it is desired to light the gas, the cock, B, is pulled down in the loop, C, and in that position it distends a spring in D, the tendency of which is to pull it up and close the communication between the burner and the supply pipe, but the cock is held down by a catch connected to the bent arm, H. The gas being ignited at G, the air in F is heated, and the consequent distention of the chamber by the mechanism in E holds H so as to allow the gas to pass freely to the burner. The moment, however, the flame is extinguished, the air contracts in F, the mechanism is released, and H is drawn from holding the valve open, the spring in D pulls up B, and the valve is closed, the whole being then perfectly safe. It is so constructed that the self-closing arrangement can be used only when thought necessary, and with or without a cock in the gas-pipe.

It is the invention of A. R. Marshall, of Stratford, Conn., and was patented by him Aug. 26, 1856. Mr. M. will be happy to furnish any further information upon being addressed as above, and we can sincerely recommend his invention to all gas consumers.

Coal Pit.—The deepest coal pit in Great Britain, and probably in the world, has just been completed and opened at Dukenfield, Cheshire. The shaft is 686½ yards deep, and the sinking of it, which has occupied nearly twelve years, has cost about $500,000.

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